

**THIS ARMS CONTROL DOG  
WON'T HUNT: THE PROPOSED  
FISSILE MATERIAL CUT-OFF  
TREATY AT THE CONFERENCE  
ON DISARMAMENT**

**Guy B. Roberts**

INSS Occasional Paper 36

*Arms Control Series*

January 2001

USAF Institute for National Security Studies  
USAF Academy, Colorado

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE <b>JAN 2001</b>		2. REPORT TYPE		3. DATES COVERED -	
4. TITLE AND SUBTITLE <b>The Arms Control Dog Won't Hunt: The Proposed Fissile Material Cut-Off Treaty at the Conference on Disarmament</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>USAF Institute for National Security Studies, USAF Academy, CO, 80840</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES <b>The original document contains color images.</b>					
14. ABSTRACT <b>see report</b>					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES <b>76</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			



The views expressed in this paper are those of the author and do not necessarily reflect the official policy or position of the Department of the Air Force, the Department of Defense, or the U.S. Government. This paper is approved for public release by the Department of the Navy; distribution is unlimited.

\*\*\*\*\*

Comments pertaining to this paper are invited; please forward to:  
Director, USAF Institute for National Security Studies  
HQ USAFA/DFES  
2354 Fairchild Drive, Suite 5L27  
USAF Academy, CO 80840  
phone: 719-333-2717  
fax: 719-333-2716  
email: james.smith@usafa.af.mil

*Visit the Institute for National Security Studies home page at*  
<http://www.usafa.af.mil/inss>



## TABLE OF CONTENTS

Foreword	vii
Executive Summary	ix
Introduction	1
The Clear and Present Danger of Fissile Material Proliferation	4
Fissile Materials: Why Such a Proliferation Concern?	4
The FMCT In Context: On-going Fissile Material Nonproliferation Initiatives	10
The Parameters of a Fissile Material Cut-Off Treaty	14
What the United States Proposes and Its Possible Scope	14
The Negotiating History: The Elusive Dream	20
Current Status: Paralysis in the Conference on Disarmament	26
Verification and the Role of the IAEA	35
Alternative Approaches: Potential Options in the Face of a Deadlocked Conference on Disarmament	42
Concluding Thoughts: Why This Dog Still Won't Hunt and What It Means to the Future of the Conference on Disarmament	47
Notes	51



## FOREWORD

We are pleased to publish this thirtieth-sixth volume in the *Occasional Paper* series of the US Air Force Institute for National Security Studies (INSS). This paper is particularly timely, as it addresses emerging issues based in the changing forms and norms of post-Cold War arms control. These issues confront United States strategic planners and the national security policy community today, and they promise to have increasing impact into the future. As traditional arms control—with its focus most centrally on limiting and then reducing fielded U.S. and Soviet/Russian strategic systems—evolves into multilateral and multidimensional efforts to stem the now-central threat of proliferation, the whole landscape of arms control changes. The players, the multiple agendas, the role of international organizations in addition to the traditional focus on states all increase the complexity of the game and the difficulties in forging successful and verifiable international agreement at the very time when the problems of proliferation rise to the top of national security calculations. Guy Roberts explains this complexity and its effects on arms control—placing process over product and forcing those serious about controlling fissile materials to go in search of varied avenues and approaches—to educate us all on the emerging “rules of the game.”

### *About the Institute*

INSS is primarily sponsored by the National Security Policy Division, Nuclear and Counterproliferation Directorate, Headquarters US Air Force (HQ USAF/XONP) and the Dean of the Faculty, USAF Academy. Our other sponsors currently include the Air Staff's Intelligence, Surveillance, and Reconnaissance Directorate (XOI) and the Air Force's 39th and 23rd Information Operations Squadrons; the Secretary of Defense's Office of Net Assessment (OSD/NA); the

Defense Threat Reduction Agency; the Army Environmental Policy Institute; and the Air Force long-range plans directorate (XPXP). The mission of the Institute is “to promote national security research for the Department of Defense within the military academic community, and to support the Air Force national security education program.” Its research focuses on the areas of greatest interest to our organizational sponsors: arms control, proliferation, regional studies, Air Force policy, information operations, environmental security, and space policy.

INSS coordinates and focuses outside thinking in various disciplines and across the military services to develop new ideas for defense policy making. To that end, the Institute develops topics, selects researchers from within the military academic community, and administers sponsored research. It also hosts conferences and workshops and facilitates the dissemination of information to a wide range of private and government organizations. INSS provides valuable, cost-effective research to meet the needs of our sponsors. We appreciate your continued interest in INSS and our research products.

JAMES M. SMITH  
Director

## **EXECUTIVE SUMMARY**

The proliferation of fissile materials, the key ingredients to making nuclear weapons, is a major threat to international peace and security. The lack of adequate controls over such materials in the former Soviet Union, the growth of civilian produced fissile material inventories, the development of a nuclear weapons capability by states not members of the Nuclear Nonproliferation Treaty (NPT), and clandestine programs by rogue states have heightened the concern that these materials will be used in illicit new programs. To stem the flow of these materials, the United States has embarked on a number of bilateral and multilateral initiatives as part of its nonproliferation strategy. Since 1993, a key component of that strategy is the negotiation of a Fissile Material Cutoff Treaty (FMCT) in the Conference on Disarmament.

The United States' concept of an FMCT follows closely the outlines of such an agreement as contained in the 1993 UN resolution calling for a "nondiscriminatory, multilateral and internationally and effectively verifiable treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices." The proposed treaty would ban the production of fissile material for nuclear weapons or other nuclear explosive devices. It would not address stockpiles (previously produced) of fissile materials. It would not apply to non-fissile materials, nor would it apply to exotic materials such as tritium or americium. Further, it would not apply to fissile materials not used for weapons purposes. This is particularly important with regards to naval propulsion systems.

The idea of restricting the production of fissile materials as an arms control measure dates from as early as 1946, and it has resurfaced numerous times since. A principal difference between those earlier proposals and the current proposal is that this version is packaged as a nonproliferation measure primarily designed to place a check on the

weapons programs of the so-called “threshold” states; Israel, India, and Pakistan. It is also viewed as an arms control measure by engaging these nations in a limited, palatable process of capping expansion of their nuclear weapons programs and those of the Nuclear Weapons States (U.S., Russia, China, France, Great Britain). Absent the participation of the threshold states, the FMCT becomes essentially irrelevant since NPT parties are required to have safeguards agreements with the International Atomic Energy Agency (IAEA) and not produce fissile materials for weapons purposes unless they are one of the Nuclear Weapon States.

The negotiations for an FMCT have stalled in the Conference on Disarmament (CD) for over five years, and could easily be called a failure. There is no real agreement on the scope of the proposed FMCT, with some states insisting that existing stocks be included in the negotiations. There is no consensus on the duration of such an agreement, the materials to be covered, and transparency and verification measures. Verification of such an agreement is problematic as the experiences with Iraq and North Korea have demonstrated.

Israel, while not objecting to the negotiations, will not accept an FMCT until a Middle East Peace Agreement is reached, and India and Pakistan remain lukewarm at best over the proposal, even after their nuclear weapons tests in 1998, because of perceived unfairness by preserving inequities between the nuclear weapons states (NWS) and the rest of the world. Subsequently, China (and then Russia) have held the talks hostage to agreement on negotiating nuclear disarmament, an agreement to prohibit arms in outer space, and the termination of the United States’ efforts at development of a national missile defense system. All efforts at reviving the talks have been futile.

A number of alternatives to the talks at the CD have merit. These include talks among the NWS and threshold states, initiating bilateral discussions similar to the U.S.-Russia agreements, more active

involvement of the IAEA, and pursuing other confidence building and transparency measures. However, all of these have little chance of success absent the political will of the parties concerned to pursue them. The futility of this effort raises anew concerns about the entire process and the viability of the CD. Pressure will continue to mount for the United States to provide concessions for the sake of agreement but at the expense of important national security considerations. Arms control measures will not resolve the reasons that have precipitated the proliferation of fissile materials. Consequently, the United States will be better able to pursue its nonproliferation objectives through bilateral diplomacy encouraging the development of democratic institutions and peaceful resolution of regional disputes.



***THIS ARMS CONTROL DOG WON'T HUNT: THE  
PROPOSED FISSILE MATERIAL CUT-OFF TREATY AT  
THE CONFERENCE ON DISARMAMENT***

**INTRODUCTION**

Nuclear nonproliferation has long been a principal security objective of the United States and most other countries. The nuclear nonproliferation treaty (NPT), which took effect in 1970, sought to limit nuclear weapons to the countries that then possessed them (the United States, the Soviet Union, the United Kingdom, France, and China)—the NPT acknowledged nuclear weapon states. Since then, India and Pakistan have tested nuclear weapons and it is believed that both Israel and North Korea have nuclear weapons capabilities of varying degree.

For years arms control proponents have advocated halting the production of fissile material (separated plutonium and highly enriched uranium)<sup>1</sup> as a means of capping the arsenals of the nuclear-weapon states (NWS). Since the 1970s, countries that have forsworn nuclear weapons have viewed a ban on fissile material production as an important way for the nuclear weapon states to show good faith toward nuclear disarmament—one of their obligations under the Nuclear Nonproliferation Treaty (NPT). In addition to being perceived as a step towards ultimate nuclear disarmament, arms control advocates (and the United States) also see a fissile material production cutoff as an important nonproliferation measure, one that would for the first time bring the undeclared nuclear weapon states—India, Israel, and Pakistan—and other states of proliferation concern into the international nonproliferation regime. Although these states have remained unwilling to sign the NPT, it is argued that they may be persuaded to sign up to a cutoff ban, which would ensure that their nuclear arsenals and material stocks would be frozen at relatively low levels.

One of the stated objectives of the United States' current nonproliferation policy is to cap and eventually reverse the nuclear-weapon

programs in these undeclared nuclear-weapon states. Another is to prevent terrorist and other sub-national groups from gaining access to nuclear weapons or to the fissile materials necessary for such weapons.

To help achieve these objectives, President Clinton outlined in September 1993 a "framework" to prevent the proliferation of weapons of mass destruction.<sup>2</sup> This framework included a proposed multilateral convention prohibiting the production of fissile materials except for purposes other than nuclear-weapon production and then only if it is done under international safeguards. The United Nations General Assembly endorsed the proposal and subsequently called for a "nondiscriminatory" treaty, one that applies to declared and undeclared nuclear-weapon states and nonnuclear-weapon states alike, recognizing that such an agreement would be a "significant contribution to nuclear non-proliferation in all its aspects."<sup>3</sup>

Fissile materials are the fundamental ingredients of all nuclear weapons and they also happen to be the most difficult and expensive part of a nuclear warhead to produce. There are obvious benefits for stopping or "cutting off" the production of fissile materials. As discussed in more detail later in this paper, it would limit the size of potential nuclear arsenals. It would make reductions irreversible if fissile materials were transferred from dismantled weapons and other unsafeguarded stocks to non-weapons use or disposal under international standards. It would strengthen the non-proliferation regime by opening nuclear facilities in all states to some form international inspection.<sup>4</sup>

Capping the amount of fissile material in the world is a major priority for the United States as it undertakes a variety of measures to reinforce the international nuclear nonproliferation regime and pursue its nonproliferation goals. While the focus of most of these initiatives have primarily been with the problem of lax security and the protection and safeguarding of materials in the former Soviet Union from becoming a proliferation concern,<sup>5</sup> the United States' 1993 proposal for a Fissile Material Cutoff Treaty (FMCT) was the one initiative designed to capture and stop the proliferation of fissile materials in

other countries who were suspected of or had admitted to nuclear weapons programs. Once in force, this FMCT would ostensibly create a norm that calls for the universal and non discriminatory capping of the production of all fissile materials, and, through an-as-yet-undefined verification regime, it would outlaw the production of these materials for any purpose, with the exception of possibly production under international safeguards if required for purposes other than weapons fabrication.

As a result of U.S. pressure and with the United Nations stamp of approval, the 66-nation Conference on Disarmament (CD)<sup>6</sup> agreed on a consensus-negotiating mandate for a fissile material cutoff treaty in March of 1995. Unfortunately, despite initial promising progress and almost unanimous support, substantive negotiations on an FMCT have yet to begin and are unlikely to begin for the foreseeable future. Treaty negotiations have become hostage to other CD priorities, such as nuclear disarmament or prevention of an arms race in outer space, and blatant obstructionism by some key member states. An obviously important non-proliferation initiative is in danger of being irretrievably lost, and this failure has the potential to change the dynamics for future multilateral arms control initiatives.

This paper will review the history of fissile material cut-off efforts, examine why the current negotiations are at a standstill, describe the reasons for that failure, discuss the conduct of related initiatives elsewhere, review the attempts to deal with FMCT technical problems on the fringes of ongoing negotiations and consider the significance of the FMCT to the arms control process. Some possible alternatives will be examined including the feasibility of these proposals given the current political climate, and, in the face of a paralyzed negotiating forum, discuss the viability of these proposals. Finally, some observations about the process will be made and some comments and recommendations offered as to the utility of such negotiations for the future and their benefit to U.S. national security.

## THE CLEAR AND PRESENT DANGER OF FISSILE MATERIAL PROLIFERATION

As the new millennium approaches, the United States faces a heightened prospect that regional aggressors, third-rate armies, terrorist cells, and even religious cults will wield disproportionate power by using—or even threatening to use—nuclear weapons against our troops in the field and our people at home.

-- Secretary of Defense William Cohen<sup>7</sup>

### **Fissile Materials: Why Such a Proliferation Concern?**

The end of the Cold War and the development of civilian nuclear energy industry have led to the emergence of growing quantities of fissile materials. Stockpiles of these nuclear materials pose a danger to national and international security in the form of potential proliferation of nuclear or radiological weapons and potential environmental, safety and health consequences. They are the *sine qua non* of nuclear weapons, and as such are the primary technical barrier to acquisition of a nuclear weapons capability. Consequently, there have been over the last ten to fifteen years a number of key developments that have exacerbated the situation, raising it to one of a national and international crisis. These include:

1. **Nuclear arms reductions.** The United States and Russian nuclear arms reductions have led to the dismantlement of large numbers of weapons and a substantially reduced military need for fissile materials. At the same time, there is the corresponding need to account for and protect these materials, and to assure the world that they will never again be used for nuclear weapons.
2. **Disposition of fissile materials.** As large quantities of plutonium and HEU become available from disarmament and dismantlement of nuclear weapons, decisions must be made as to the ultimate disposition of these materials.
3. **Stockpiling of civil plutonium.** The development of the reprocessing industry and the delay in breeder and other plutonium use programs are leading to the accumulation of growing stockpiles of plutonium for which there is no near-term civil use. This is a significant proliferation risk requiring

national efforts to prevent further accumulation of excess stocks and plan for their eventual reduction and elimination.

4. **Threat of theft, diversion and smuggling.** States, like Russia, with large quantities of fissile materials have inadequate material control and accountancy and physical protection systems. These states are experiencing major economic and political upheaval, resulting in considerable concern that the theft of weapons-usable materials could occur.
5. **Continued production of unsafeguarded fissile materials.** Enrichment or reprocessing facilities continue to operate that are not subject to international safeguards. The plutonium and HEU from these plants continue to be available for nuclear weapons.

The dangers of nuclear proliferation are enormous. The availability of fissile materials makes it more likely that a leader such as Saddam Hussein or Kim Jong Il will soon have his finger on the nuclear button. And with nuclear weapons in the hands of small states involved in regional conflicts, the chances that nuclear weapons will actually be used in combat can be greater than the chance of a U.S.-Soviet nuclear war ever was. There is also the possibility that the U.S. forces deployed to the next conflict or crisis will face the threat of nuclear weapons.

Obtaining this fuel is often the greatest obstacle for a nation's nuclear program. Unfortunately, the end of the Cold War may make nuclear fuel more abundant and easier to obtain. Once these materials are acquired, construction of nuclear weapons would be relatively straightforward for either sophisticated terrorists or proliferant states. With a few kilograms of fissile materials these illicit actors could make a crude but workable nuclear bomb in the 10-100 kiloton range. A low-yield "dirty" nuclear weapon made from reactor-grade plutonium in a truck could easily serve a terrorist's purposes, demolishing a small city and spreading radioactive fall-out far and wide.<sup>8</sup> Little wonder the international community is so concerned and so determined to prevent the further spread of these materials.

In the hands of irrational leaders, fissile materials can also be a horrid terror weapon. Plutonium, because of its radioactivity, is very carcinogenic if

ingested. A pinpoint-sized piece of plutonium metal can lead to lung cancer, and only 150 kilograms, distributed appropriately, is enough to give lung cancer to every human being on the planet. Plutonium has the capacity to contaminate air, drinking water, or the land itself. If plutonium is dispersed into the atmosphere by a conventional explosive, it could be a dreadful anti-personnel weapon.

Because of the difficulty of controlling nuclear proliferation, a tremendous danger is posed when the greatest technical barrier to developing nuclear weapons, the acquisition of fissile materials, is eroded. The existence of fissile materials is not a grave threat in itself. Fissile materials have been around as long as nuclear weapons. But, ironically, they were less of a proliferation threat while they were deep inside well-guarded nuclear warheads. Rather, the threat of fissile materials now stems from the current lack of adequate security for HEU and plutonium in storage.

Severely underpaid personnel, some of whom are open to bribes, currently guard fissile materials from dismantled nuclear warheads in Russia. The expanding network of organized crime in Russia is also a grave concern, for organized crime could provide the infrastructure for successfully stealing, selling, and smuggling fissile materials, of even whole warheads.<sup>9</sup> Additionally, there is no comprehensive system for accounting of fissile materials in Russia. Nobody is certain of exactly how much fissile material is in the Russian stockpile. Consequently, nobody will know for sure if some of it is missing.

Russia is not the only source of fissile materials. Fissile materials from dismantled U.S. nuclear weapons are accumulating as well. U.S. storage facilities for fissile materials may be more secure than their Russian counterparts, but the U.S. Government will soon have more fissile material than it knows what to do with, and the Clinton Administration did not set out a plan for what the ultimate fate of these materials, especially plutonium, will be.<sup>10</sup> Plutonium presents a special problem because, unlike HEU, it cannot be blended down, and other means must be used for making plutonium unsuitable

for weapons.<sup>11</sup> Currently, U.S. nuclear weapons are dismantled at the Department of Energy's Pantex facility near Amarillo, Texas. Pantex dismantles about 2000 warheads per year and the resulting plutonium is stored there in a special storage facility. But beyond this interim storage, there are no concrete plans for what to do with plutonium and there is not enough storage space for all the plutonium from warheads the U.S. plans to dismantle. How it chooses to handle this challenge will affect the credibility of the United States' nonproliferation efforts. As President Clinton's science advisor opined:

We must keep in mind that while our own excess plutonium poses little direct security risk, the actions we take in managing it will have a major impact on the international scene. What we do with our plutonium will inevitably affect what Russia does. And what we do with the basic building blocks of our Cold War nuclear arsenal will inevitably affect how other countries manage their plutonium, and how they view our seriousness about arms reduction and nonproliferation.<sup>12</sup>

Global security is threatened by the use of plutonium as fuel in civil reactors because though it requires processing tons of the material in a bulk form which is difficult to protect from theft—only a few kilograms is needed to make a Hiroshima size-bomb. Additionally, these risks, which are already substantial, will increase, as the countries of Japan, Britain, France, Russia and India proceed with plans to separate and store ever-larger amounts of weapons-usable plutonium.<sup>13</sup> The stock of separated plutonium, which, in 1995, stood at 110 tons, is likely to approach 200 tons early in the next century.<sup>14</sup> Whether this surplus will rise or fall thereafter, and at which rate, will depend on the extent to which current reprocessing and plutonium recycling policies in Europe, Japan and Russia will be implemented.<sup>15</sup>

Reactor-grade plutonium produced for commercial nuclear power in many countries is not the best fuel for weapons, but experts agree that reactor-grade plutonium could be fashioned into a crude weapon. Thus, the growing surplus of reprocessed civilian plutonium could pose a substantial threat to non-proliferation if it is not well guarded.<sup>16</sup> Unfortunately, civilian fissile

materials are not entirely secure. Security measures at commercial reprocessing plants in Japan, England, and France are not without flaws, and since some plutonium is often "lost" because of such factors as residues in pipes and the like, not all plutonium can be accounted for. A threat also exists when plutonium is transported from one site to another. Currently, Japan ships plutonium a thousand kilograms at a time from Europe with only a Japanese Coast Guard escort, potentially making it vulnerable to attack by terrorists seeking fissile materials.

Just as fissile materials are difficult to obtain, they are difficult to dispose of as well, thus adding to the proliferation dilemma. Plutonium has a half-life of 24,000 years, which means that it will retain its hazardous radioactivity for thousands of years. Uranium remains radioactive even longer. The lasting radioactivity of these materials means that they will continue to be a proliferation threat as well as a danger to humans for generations to come.

Since even reactor-grade plutonium can be used to make a nuclear weapon, plutonium produced for the civilian nuclear power industry is also a proliferation risk. The fact that most civilian plutonium is reactor grade rather than weapon grade provides small comfort. Indeed, as one expert warned, "the greatest long-term threat to . . . the world may yet lie in the production and use of nuclear explosive materials in civilian commerce."<sup>17</sup> France, Great Britain (which together account for about 90% of global commercial plutonium separation—approximately 20 tons a year), Russia and India produce small amounts of plutonium.<sup>18</sup> The IAEA estimates that in 1997 about 10,500 tons of spent fuel was discharged from nuclear power reactors worldwide; this amount contains about 75 tons of plutonium. It is estimated that the annual production figure will remain more or less the same until 2010. The cumulative amount of plutonium in spent fuel from nuclear power reactors worldwide is predicted to increase to about 1700 tons by 2010.<sup>19</sup> This is enough to make thousands of nuclear weapons.

The very large existing and proposed civilian programs under which reactor-grade plutonium is being separated and stockpiled will inevitably

become an issue in negotiations over a FMCT and over reduction of the stocks of military fissile materials. Twenty-five years ago, India's 1974 nuclear test demonstrated that a nominally civilian program could be used as a cover for the production of plutonium for nuclear weapons. As the Department of Energy recently noted:

At the lowest level of sophistication, a potential proliferating state or sub-national group using designs and technologies no more sophisticated than those used in first-generation nuclear weapons [e.g. the Nagasaki bomb] could build nuclear weapons from reactor-grade plutonium that would have an assured reliable yield of one or a few kilotons (and probable yield significantly higher than that). At the other end of the spectrum, advanced NWS such as the United States and the Russian Federation, using modern designs, could produce weapons from reactor-grade plutonium having reliable explosive yields, weight, and other characteristics generally comparable to those of weapons made from weapon-grade plutonium....<sup>20</sup>

Further, both the U.S. and Russia have been dismantling most of their withdrawn nuclear warheads, in accordance with the START I and START II treaties, and placing fissile materials from these warheads into short-term storage. (Russia inherited the Soviet Union's nuclear weapons, as well as its treaty obligations.) These treaties are expected to shrink the number of deployed nuclear warheads to around 12,000 worldwide, with perhaps another 10,000 in storage. However, neither treaty suggests what actions are to be taken once warheads are withdrawn from deployment. The amount of weapons-grade fissile materials to be recovered from them is staggering: over 600 metric tons of HEU and between 100 and 200 metric tons of weapons-grade plutonium.

The enormity of the problem posed by huge stocks of fissile materials was recognized and the United States took the lead in declaring that it had stopped the production of highly enriched uranium (HEU) and plutonium for weapons in 1964 and 1988 respectively. Realizing the threat from growing stocks of plutonium and HEU, the U.S. further declared that since March

1992, it had suspended the reprocessing of plutonium for nuclear weapons. It had also agreed to permanently remove 200 tons of these materials from availability for future use in weapons.<sup>21</sup> This was to encourage other NWS, especially Russia, to do the same. However, the Russian attitude towards plutonium stocks was different. It considered the stocks as "a national treasure" which needed to be preserved in order to produce energy for future generations. This attitude, although changing, coupled with severe control, accounting and physical protection deficiencies, heightens concern over Russia's commitment to control, cap and ensure fissile materials are not diverted to its or some other nuclear weapons program.

Recognizing the threat is one thing; developing an integrated and cohesive strategy to deal with it has been exceedingly difficult in concept and execution. Although recognizing the enormous problem associated with the civilian reactor programs as sources of fissile materials, efforts to address that concern have been piecemeal and frustrating, in part because friends and allies have invested substantial amounts in these programs and are not, for the short term, willing to have them be captured under arms control or nonproliferation initiatives. Consequently, this is one of the major deficiencies of both bilateral agreements and multilateral negotiations such as those for an FMCT.

Nevertheless, there are a number of initiatives being undertaken that need to be considered in the context of potential FMCT negotiations if one is to appreciate the progress in ensuring fissile materials are safeguarded and the quantities of such materials available for weapons purposes diminishing.

#### **The FMCT in Context: On-going Fissile Material Nonproliferation Initiatives**

The FMCT is viewed by the United States as a key component in its nuclear nonproliferation strategy. Although one of its highest priorities, it should not be considered in isolation, particularly in view of the current paralysis in the CD, but rather in the context of the full range of on-going bilateral and multilateral initiatives to curb fissile material proliferation.

When the Union of Soviet Socialist Republics unraveled, it left a large amount of fissile materials dispersed throughout the former Republics (Kazakhstan, Ukraine and Belarus, for example). As previously noted, the efforts of reducing the world's stockpile of nuclear weapons created a serious concern over fissile material smuggling and growing incidences of nuclear theft. Additionally, U.S.-Russian bilateral agreements to dismantle surplus equipment have increased the volume of surplus nuclear materials.<sup>22</sup> These materials need to be properly safeguarded and steps taken to ensure that they never again become part of a nuclear weapon.

Consequently, a number of separate, but mutually reinforcing bilateral and multilateral steps have played a key role in ensuring the furtherance of our fissile material nonproliferation goals. These steps include: (1) freezing the development of advanced new types of nuclear weapons; (2) reducing the number of delivery vehicles and warheads; (3) limiting the amount of fissile material available for use in nuclear weapons; and (4) ensuring that excess fissile material is never returned to nuclear weapons programs. These steps are being vigorously pursued through the START process, and various other bilateral, multilateral, and unilateral initiatives. For example, the U.S. has removed more than 225 metric tons of fissile material from its nuclear stockpile and has voluntarily pledged to place this excess fissile material under IAEA (International Atomic Energy Agency) safeguards as soon as possible. This process—along with many other initiatives—is well underway.<sup>23</sup>

Indeed, since the end of the Cold War an extraordinary amount of progress has been made toward agreement on a bilateral cut-off and bilateral reductions of stocks of weapons-usable fissile material. This is not an insignificant achievement. One expert estimate is that the fissile material from the warheads to be dismantled as a result of both the several missile-reduction treaties through START II, and the Bush-Gorbachev/Yeltsin reciprocal nuclear weapon withdrawals, amounts to about 80 percent of the material deployed in weapons at the height of the Cold War.<sup>24</sup>

It has started and is implementing a number of unilateral, bilateral and multilateral initiatives in that regard. These include, but are not limited to,<sup>25</sup> the following:

1. In connection with pledges to make excess U.S. fissile material available for IAEA verification, the U.S. Department of Energy announced on December 1, 1997 the start of verification activities by the IAEA on U.S. HEU downblending operations. The operation is being carried out under IAEA safeguards.
2. In April 1996, Russian President Boris Yeltsin declared that the fissile material storage facility being constructed in Mayak with U.S. assistance would be made subject to IAEA inspections.
3. In September 1996, the U.S. joined with Russia and the IAEA in a “trilateral initiative” aimed at developing verification and monitoring methods that the IAEA could use in inspecting excess weapons-origin fissile materials. In September 1997, the Russian Federation announced its decision to withdraw from military use up to 500 metric tons of highly enriched uranium and up to 50 metric tons of plutonium.<sup>26</sup>
4. The United States and Russia have taken substantial steps concerning the disposition of excess separated plutonium from nuclear military programs. In 1998 the U.S. and Russia signed a number of agreements on the management and disposition of plutonium no longer needed for defense purposes outlining agreed principles for the disposition of plutonium and stated the commitment of the two countries to immediately initiate negotiations of a bilateral executive agreement to implement the program. An agreement was finally signed 1 September 2000.<sup>27</sup>
5. In order to demonstrate the irreversibility of the nuclear disarmament process, the United States in 1994 and 1995 placed approximately 12 metric tons of excess HEU and plutonium, in nonsensitive forms, under international safeguards pursuant to the U.S.-IAEA voluntary offer safeguards agreement. On March 1, 1995, President Clinton announced the permanent withdrawal from the U.S. nuclear stockpile of approximately 200 metric tons of fissile material. In September 1996, the Department of Energy announced plans to bring 26 of these 200 tons under international inspection, in addition to the twelve tons already under IAEA safeguards at Department of Energy facilities. In September 1997, the Secretary of Energy announced that another 52 metric tons of material—37 metric tons of HEU and 15 metric tons of

plutonium—would be made available for IAEA verification over the next several years. This brings the total amount of U.S. excess fissile material to be made available for IAEA verification to 90 metric tons, including the 12 tons already under inspection and 13 tons of HEU already downblended to low enriched uranium (LEU) for use as fuel in civil power reactors.

6. The dissolution of the Soviet Union left a vast nuclear arsenal and hundreds of tons of nuclear-weapons-usable materials in inadequately protected facilities in Russia and other states of the Former Soviet Union. Recognizing that these unsecured materials may pose a proliferation and nuclear terrorism risk, the United States, Russia, and other states, such as Ukraine and Kazakhstan, have been engaged in a partnership almost since the breakup of the Soviet Union in 1992 to prevent theft or loss of these nuclear materials.<sup>28</sup>
7. In 1997, the United States and Russia completed an agreement to cease production of weapons-grade plutonium for any purpose no later than the year 2000. The U.S. already shut down all of its plutonium production reactors as of 1989, and Russia has shut down all but three. The U.S. will work with Russia to help convert the three remaining production reactors so that they no longer produce weapons-grade plutonium. In addition, the plutonium produced by these reactors between the beginning of 1995 and the time of their conversion will not be used in nuclear weapons. The agreement includes an extensive monitoring regime to provide confidence that these obligations are fulfilled.
8. The U.S. signed a government-to-government HEU Purchase Agreement in February 1993, which provided for the purchase by the United States of 500 metric tons of HEU from dismantled Russian nuclear weapons over a 20-year period, for approximately \$12 billion. In March 1999 agreement was reached concerning the disposition of the natural uranium component of material delivered under the HEU Purchase Agreement. In 1999 implementation of enhanced transparency measures continued at Russian HEU-to-LEU blending facilities to increase U.S. confidence that uranium purchased under the HEU Agreement is weapon origin material.
9. To combat the problem of unsecured and unaccounted for fissile materials, the United States is active in all phases of the IAEA's activities in physical protection and material security. In 1999, the U.S. provided funding to the IAEA and worked with the agency and other donor states to improve security at nuclear sites

in the states of the Former Soviet Union. This specialized work has been concentrated primarily on material protection control and accountancy (known as MPC&A) of fissile materials in Ukraine, Kazakhstan, Belarus, Latvia, Lithuania, Uzbekistan and Georgia. Since the start of this effort in 1995, the U.S. has provided MPC&A-related upgrades at thirteen sites at a cost to the United States of approximately \$45 million, funds which otherwise would have been needed by the IAEA to effect similar improvements.

10. Finally, a significant multilateral initiative that relates to stocks of weapons-usable material is the recent "Plutonium Management Guidelines." Nine countries negotiated and signed the new guidelines, including the five NPT nuclear weapon states plus Belgium, Germany, Japan, and Switzerland. The guidelines require annual reports of their plutonium stocks to provide greater transparency, strengthened security standards to improve physical protection against theft or sabotage for fissile materials at home as well as those being exported, and placement under IAEA safeguards of plutonium belonging to the Five that is excess to their weapons needs as a result of their weapons reductions.<sup>29</sup>

While the progress in these areas is substantial and noteworthy, they do not capture or include the participation of those states that are not members of the NPT and have unsafeguarded enrichment and reprocessing facilities. So, within the context of these unilateral steps by the United States, U.S.-Russian bilateral initiatives, and the minor success of establishing the "Guidelines" for plutonium management, it was optimistically hoped that there would be an equivalent measure of progress on negotiating a treaty that would include these "threshold" states. Unfortunately, that has not been the case. The reasons include differing views on what an FMCT would encompass and a changing political dynamic brought on by linking progress on an FMCT to other arms control issues.

## **THE PARAMETERS OF A FISSILE MATERIAL CUT-OFF TREATY**

### **What The United States Proposes and Its Possible Scope**

As one of the driving forces for an FMCT in the 1990's, and viewing it as an integral part of its nonproliferation strategy, the U.S. believes that a legally

binding and effectively verifiable FMCT would contribute significantly to nuclear arms control, disarmament and nuclear non-proliferation worldwide. In fact, a principal difference between previous cutoff proposals over the last forty years and the new proposal is that it is packages as a nuclear nonproliferation measure primarily designed to check the weapons program of Israel, India and Pakistan. Certainly, it is highly unlikely that the U.S. would participate in any negotiation that did not include, at a minimum, India and Pakistan.<sup>30</sup>

The United States' concept of an FMCT follows closely the outlines of such an agreement as contained in the UN resolution. The proposed treaty would ban the production of fissile material for nuclear weapons or other nuclear explosive devices. It would not address stockpiles (previously produced) of fissile materials. It would not apply to non-fissile materials, like tritium,<sup>31</sup> nor would it apply to exotic materials such as americium.<sup>32</sup>

Further, it would not apply to fissile materials not used for weapons purposes. This is particularly important with regards to naval propulsion systems, which use HEU.<sup>33</sup> The U.S. and Russia have extensive nuclear propulsion programs, representing by far the largest fleets globally, using HEU in the reactor cores. Some have argued that the U.S. proposal, since it does not prohibit the non-explosive use of fissile material for a military purpose such as the propulsion of a naval ship, thus leaves the door ajar to nuclear weapons acquisition. Nevertheless, the United States, and other NWS with nuclear powered vessels insist that the dangers of losing national security information are too great to warrant inclusion or greater transparency. Currently, the U.S. Navy HEU supplies are sufficient for many decades, but it still maintains its right to withdraw any fissile weapons-usable material put under international safeguards if it becomes necessary.<sup>34</sup>

The proposal would reduce the "discriminatory" nature of the current nonproliferation regime (the NPT)<sup>35</sup> by stripping both the weapon and threshold states of their exclusive right to produce unsafeguarded fissile material. It will make no distinction between nuclear weapons states and non-

nuclear weapon states. The FMCT would not bestow any new status on any state, but rather constrain all parties equally by banning any further production of fissile material for nuclear weapons on a global basis.<sup>36</sup>

However, the threshold states point out that, although nondiscriminatory in its prospective application, the fissile cutoff would in fact be highly discriminatory in locking in the huge disparities between their existing stockpiles. As some critics have suggested, “the only way to eliminate completely the discriminatory nature of the nuclear nonproliferation regime will be the elimination of all national stocks of nuclear warheads and unsafeguarded fissile materials.”<sup>37</sup> This has been one of the most frequently voiced objections to the current proposal, and it would be expected that some kind of collateral measures may have to be developed to address this problem.

U.S. officials and arms control advocates have high expectations that an FMCT would achieve a number of important nonproliferation and disarmament goals in addition to the opportunity to engage India, Pakistan, and Israel in negotiations to limit the fissile material held by each.<sup>38</sup> First, it would expand to the NWS and threshold states the international norm established by the NPT against production of fissile material for nuclear weapons. The basic FMCT would only ban making weapons from newly produced plutonium or HEU, not from older stocks in reserve or from newly dismantled weapons. But as more nuclear weapons were dismantled pursuant to START and successor treaties, more fissile material from weapons would be placed irreversibly under IAEA safeguards, thus reducing the stocks available for weapons.

Second, of great interest to the non-nuclear weapon states, an FMCT would reduce the discrimination in the application of IAEA safeguards between nuclear weapon and non-nuclear weapon states. The NPT permits the NWS to be free of safeguards but requires them of all other parties. While each of the NWS has accepted some safeguards to help reduce that discrimination, each of their agreements so far is a “voluntary offer” that can be withdrawn at will. The FMCT would impose mandatory safeguards or a

similar type inspection regime on plants for separating plutonium and enriching uranium, and on other nuclear facilities using newly produced fissile materials.

Third, an FMCT would continue the movement toward transparency and safeguards for all stocks of fissile materials similar to the bilateral initiatives and the Plutonium Management Guidelines, discussed, *supra*. Fourth, an FMCT should encourage higher standards for the physical protection of fissile material from theft or sabotage. Requiring international accountability and IAEA safeguards should encourage better security practices, which Russia, the United States, and the nine Plutonium Management Guidelines countries have agreed to pursue. The FMCT would provide the same incentives for India, Israel, and Pakistan, as well as non-nuclear weapon states with civil plutonium and HEU to protect. Fifth, an FMCT will satisfy the 1995 promise by the NWS to negotiate such a treaty in return for the agreement of the non-weapon NPT states to extend the NPT indefinitely.<sup>39</sup>

Sixth, an FMCT would lay the foundation for further steps toward eventual nuclear disarmament. Total nuclear disarmament is clearly impractical until nuclear weapons and fissile materials can all be accounted for, protected from theft or sabotage, verified by an international organization and guaranteed against reversibility to weapons manufacture. To make nuclear disarmament feasible, such verification and irreversibility must somehow be made effective. FMCT negotiations offer a realistic opportunity to learn how. As President Clinton said in his January 21, 1997 message to the Conference on Disarmament, "effectively cutting off the spigot for more nuclear weapons is a necessary step toward, and would greatly contribute to, the ultimate goal of nuclear disarmament."<sup>40</sup> The FMCT would help foster the creation of a climate conducive to continued, long-term progress on reducing nuclear-weapon stockpiles. Looking at post-START III negotiations, perhaps involving all the nuclear weapon states, it is difficult to imagine how nuclear arms reductions could go much deeper, unless there is a dependable limit on

fissile material for weapons, as well as confidence clandestine production could be detected.

Most nations in the CD strongly support the negotiation of an FMCT,<sup>41</sup> but opinions differ even over the fundamental issue of the basic commitment under the FMCT. Nevertheless, it is widely accepted that the FMCT should prohibit production of fissile material for nuclear weapons or other nuclear explosive devices. Thus, one would think that it would be relatively easy for states to agree that upon entry into force to undertake not to produce fissile material for nuclear weapons or other nuclear explosive devices; not to use any fissile material that is subject to the FMCT for nuclear weapons or other nuclear explosive devices; and• to accept international verification pursuant to the FMCT to provide assurance that fissile material, if being produced, is only for non-proscribed purposes.

These undertakings alone would comprise a substantial step towards the ultimate goal of nuclear disarmament. Though some states have sought inclusion of stocks of fissile material existing at the time of the FMCT's entry into force, in the face of strong objection by the Nuclear Weapon States, the only negotiable treaty is one that deals primarily with future production. Obviously, a treaty applying to future production would be a very considerable achievement, of substantial benefit to the security interests of all participants.

However, it has become increasingly clear that negotiation for an FMCT raises a number of complicated choices and questions notwithstanding the political issues that have managed to currently stymie the negotiations. How these may be eventually resolved would influence the extent to which the treaty's potential non-proliferation and arms control rewards are realized in practice. Among the more important of these questions are:

1. Should the scope of a cutoff agreement be limited to a ban on future production of plutonium and HEU for nuclear explosive purposes?
2. If no limits are placed on uses or stockpiles of previously produced materials, should stocks of such materials be declared?

3. Should continued production of plutonium or HEU for non-weapons military purposes be permitted?
4. Should providing assistance to other countries in the production of plutonium or HEU be banned outright, or only for nuclear explosive purposes?
5. Should a more comprehensive or more streamlined approach be taken to cutoff verification?
6. What should be the duration of a cutoff agreement?
7. What steps, if any, can be taken to contain concern that a cutoff convention that excludes previously produced materials will "legitimize" the unacknowledged nuclear powers?
8. Which countries' adherence should be considered critical for eventual entry-into-force?<sup>42</sup>

Additionally, in areas such as the Middle East, South Asia and East Asia the relatively permissive standard of the proposed FMCT could undermine the establishment of more restrictive regional arrangements simply by its precedential value. What kind of more restrictive arrangements? Those that seek to establish a higher level of security by barring national possession, even under safeguards, of plutonium separation and uranium enrichment capabilities. So, for example, it would be extremely unlikely that Israel would take much comfort from the operation of a uranium centrifuge enrichment plant in Iran, even though it is under safeguards. Or that China would agree to give up its nuclear weapons or even significantly reducing its nuclear weapons while Japan continues to accumulate large stocks of separated plutonium under safeguards.

Further, since an FMCT would leave in place existing stocks of plutonium and HEU accumulated for weapon-related purposes, there is a residual risk associated with further production and stockpile accumulation carried out for nonweapon purposes—activities that would be allowed under the FMCT (with safeguards). Parties to the new treaty could clandestinely build facilities to convert stored plutonium, while simultaneously constructing

the nonnuclear components of the weapons. And, with large flows of civilian fuel-cycle plutonium remaining, the threat of theft, as described earlier, remains.

Further, a question arises about countries possibly switching from IAEA safeguards to those of an inspection regime specific to the FMCT. This is unlikely since lower technology countries will not switch since they will lose access to technology available to states accepting IAEA safeguards. For rogue nations, the question is moot; they can and will operate covertly as they choose. Advanced technology countries will also continue to accept IAEA safeguards since public acceptance within the international community depends on the presence of international safeguards. In the end, if technology remains export controlled, and the IAEA remains legitimate, exit from IAEA safeguards carries a high risk for little gain.

An FMCT would thus increase the moral, legal, and to some extent, practical constraints on the production of nuclear weapons by non-NPT states, and it could decrease fissile material production by nuclear-weapon states. An FMCT is thus an important step toward nuclear disarmament for more reasons than that it would limit the quantity of weapons-usable fissile material. After the weapon tests in South Asia, FMCT negotiations were seen as a useful and important avenue to engage India and Pakistan in talks that would limit their stocks, which is, of course, the very reason the United States proposed the idea in the first place.

Unfortunately, despite some positive signs of progress and an outward declaration of support for "negotiations" by India, neither India nor Pakistan is likely to enthusiastically support any negotiation for an FMCT without major compromises and resolution of the security conundrum facing India, Pakistan and China in Southeast Asia.<sup>43</sup>

### **The Negotiating History: The Elusive Dream**

The intent of proposals banning the production of fissile material has always been to cap production of weapons material while allowing the use of nuclear energy for peaceful purposes. Three periods are distinguishable. First was a

period prior to roughly about 1967 in which fissile cutoff proposals were actively promoted by the United States and debated internationally for a as part of broad disarmament proposals. Second, a period following this until the end of the Cold War in which weapons-related arms control initiatives took precedence. And finally, the post-Cold War era characterized by unilateral actions and the re-emergence of the cutoff concept. Post-Cold War initiatives differed from previous proposals in that they were viewed as nonproliferation policy tools, not just bilateral issues. Four issues recur throughout these eras: (1) whether cutoff is a viable stand-alone concept or whether it must be part of a more extensive disarmament approach; (2) whether cutoff is a valid means of controlling horizontal and vertical proliferation; (3) how verification measures might be structured; and (4) whether a cutoff can increase U.S. and international security.<sup>44</sup>

The first attempt at banning atomic fissile materials production was made in the aftermath of the dropping of atom bombs over Hiroshima and Nagasaki in August 1945, which ended World War II.<sup>45</sup> It began with the Acheson-Lilenthal Report of 1946 (named after the U.S. Secretary of State and the future first Chairman of the U.S. Atomic Energy Commission). In this report, U.S. President Harry S. Truman introduced the concept of controlling nuclear energy and fissionable material for either peaceful or military purposes. Though the report did not provide for measures to be taken against violators, the goal of the envisaged organization was only to sound a warning signal in the event of danger.<sup>46</sup>

At the inaugural meeting of the Atomic Energy Commission, set up by the UN General Assembly to work out specific proposals for eliminating atomic weapons and all other weapons of mass destruction, the U.S. delegate, Bernard Baruch, put forward a proposal (known as the Baruch Plan<sup>47</sup>) that envisaged the creation of an International Atomic Energy Control Agency which would be entrusted with managerial control of all atomic energy activities potentially dangerous to world activities. Its duty was also to foster the beneficial uses of atomic energy. It was also to possess the exclusive right

to both conduct research in the field of atomic explosives and produce and own fissionable material. All countries were to be granted the freedom of inspection deemed necessary by the Agency.

The Baruch Plan, which was based on the Acheson-Lilienthal Report, differed from the latter in that it stressed the importance of immediate punishment for infringement of the rights of the Agency and maintained that there must be no veto to protect those who violated the agreement not to develop or use atomic energy for destructive purposes. It was later explained by the U.S. that what it had in mind was the ownership and exclusive operation by an "international atomic development authority" of all facilities for the production of fissile materials worldwide. Once a system of control and sanctions was operating effectively, production of atomic weapons would cease, existing stocks would be destroyed, and all technological information would be transferred to the "authority."<sup>48</sup>

The Soviet Union rejected the Baruch Plan on the grounds that it would interfere with the national sovereignty and internal affairs of states and that the provision denying a permanent member of the Security Council the right of veto was contrary to the UN Charter. In turn, the Soviet Union submitted a draft convention, called the Gromyko Plan (after the Soviet delegate who later became Foreign Minister), which reversed the priorities put forward by the United States. The basic differences between the two positions concerned, first, the stage at which atomic weapons were to be prohibited, i.e., whether a convention outlawing these weapons and providing for their destruction should precede or follow the establishment of a control system; and second, the role of the UN Security Council in dealing with possible violations, i.e., whether the rule of veto would be applicable.<sup>49</sup>

In 1954, India proposed a universal, non-discriminatory convention to end the production of fissile materials.<sup>50</sup> The idea was revived by India again in 1982 when it called for a "Freeze on Nuclear Weapons" asking the NWS to stop production of nuclear weapons accompanied by a cut-off in production of fissile material for weapons purposes.<sup>51</sup> This resolution was tabled

subsequently every year without any response until in 1988 it merged with a Mexican resolution on the same proposal.<sup>52</sup> No progress was achieved, these proposals coming at a time when the Cold War was continuing in all its intensity.

As a consequence of the Baruch Plan, U.S. President Dwight D. Eisenhower made his famous "Atoms for Peace" speech in 1953, at the United Nations. His plan was to promote disarmament by an indirect approach—that of building up the peaceful uses of atomic energy. The atomic powers were to contribute fissionable material for such uses to an agency which would be set up under the aegis of the United Nations and which would help countries to obtain the benefits of atomic energy. He envisioned that "fissionable material would be allocated to serve the peaceful pursuits of mankind...mobilized to apply atomic energy to the needs of agriculture, medicine...and provide abundant electrical energy in the power-starved areas of the world."<sup>53</sup> This proposal led to the establishment, in 1956, of the IAEA that went into formal operation in 1957.<sup>54</sup>

In 1956, President Eisenhower first proposed a production cutoff as a U.S.-Soviet arms control measure, but this was rejected by Moscow which saw it as a tactic to freeze the Soviet Union into a quantitatively inferior status. The Cold War of the 1950s and 1960s saw different proposals discussed for progressive nuclear disarmament and cutoff of the production of fissile material. Due to the confrontation between the United States and Soviet Union, nuclear tests and fissile material production continued as the then-superpowers played out their bipolar nuclear competition. The last official statement by the U.S. urging a fissile material production cutoff came in 1969 at the Eighteen-Nation Disarmament Committee. The U.S. proposed that IAEA safeguards would apply to fissile material production and would include verification of continued shutdown of production facilities. Despite a lack of U.S. initiative the cutoff idea remained alive in the disarmament literature.<sup>55</sup>

In 1989, the Soviet Union announced a cessation of highly enriched uranium production and the planned shutdown of all plutonium production

facilities by the year 2000. They further proposed negotiating a multilateral agreement for a verified cutoff based on IAEA safeguards. In 1992 President Bush announced that the U.S. would no longer produce plutonium or HEU for nuclear weapons.<sup>56</sup> This was followed in 1993 by President Clinton's UN General Assembly speech proposing a "multilateral convention prohibiting the production of HEU or plutonium for nuclear explosives purposes or outside of international safeguards,"<sup>57</sup> and a subsequent General Assembly resolution endorsing the beginning of negotiations in the Conference on Disarmament in Geneva in December 1993.<sup>58</sup>

As a sign of a new era in cooperation between the former adversaries of the Cold War, and as a result of the growing concern for safety and security of the Russian nuclear stockpiles and assets, on January 14, 1994 Russian President Yeltsin and President Clinton issued a joint statement on the nonproliferation of weapons of mass destruction what included support for a "verifiable ban on the production of fissile materials for nuclear weapons and the most rapid conclusion of an international convention to this effect with the widest possible participation of states on a nondiscriminatory basis."<sup>59</sup> Yeltsin then declared that 10 out of 13 Soviet reactors had already been shut down between 1987 and 1992, and subsequently committed, in an agreement with the United States on June 23, 1994 to shut down the remaining graphite moderated plutonium production reactors by 2000.<sup>60</sup>

Consensus was building among the nuclear weapons states as evidenced by a joint U.S.-China statement on October 4, 1994 promoting the "earliest possible achievement" of a cut-off treaty. Additional support came from Russia when it announced in December 1994 that it had stopped plutonium production for use in nuclear weapons from October 1, 1994. As per an earlier announcement of Mikhail Gorbachev on April 7, 1989,<sup>61</sup> Moscow had already ceased the production of HEU for use in nuclear weapons that year.

The UN resolution called for the negotiation of such a treaty in the CD and requested the IAEA to provide assistance in the examination of

verification arrangements. There was a delay at the CD at the beginning of these negotiations because of an effort, which was principally led by Algeria, Egypt, Iran and Pakistan, to broaden the CD's mandate to include negotiations of reductions so that "unsafeguarded stocks are equalized at the lowest possible level,"<sup>62</sup> a position totally unacceptable to the NWS.

For implementation of the resolution, a Special CD Coordinator, Ambassador Shannon of Canada, was appointed. Eventually, a compromise was reached that preserved the focus of the negotiations on a production cutoff but allowed for discussion of existing stocks. Another contentious issue was the question of CD being the appropriate forum for such consultations. China, for unspecified reasons, opposed setting up an ad-hoc committee to negotiate a cut-off. Shannon ultimately was able to convince China to drop its opposition and patch over other differences by the CD delegates. On March 23, 1995 the CD agreed by consensus to establish an ad hoc committee and called for an appropriate negotiation of a mandate to "...ban the production of fissile material for nuclear weapons or other nuclear explosive devices..." and concluded with a call for the negotiation of a final treaty.<sup>63</sup> This was supposedly a key step toward substantive work. In August 1998, the CD finally re-established the Ad Hoc Committee to negotiate a cutoff treaty. The committee met twice and has not been re-established since. No substantive work on a treaty has started and the CD has been unable to re-establish a consensus to get negotiations started. Obviously, a five-year delay is hardly a legacy that the CD can be proud of.

Meanwhile, at the May 1995 nuclear NPT Review and Extension Conference, there was agreement on an action plan on the "Principles and Objectives for Nuclear Non-Proliferation and Disarmament" which included the immediate commencement and early conclusion of cutoff negotiations in accordance with the 1995 CD mandate. The five NWS committed themselves to the "early conclusion" of negotiations on a cutoff. A group led by Pakistan (with Indian support) delayed negotiations, insisting that cutoff negotiations be linked to parallel talks on nuclear disarmament.<sup>64</sup> Pakistan was not eager to

sign an agreement that would lock in its inferiority relative to India, and India, now facing a nuclear Pakistan, was reluctant to cap their stockpile of weapons material at a level far less than that of China.<sup>65</sup> There was broad agreement, however, on the role of the IAEA in implementing safeguards agreements and its continuing efforts to improve safeguards effectiveness and efficiency.<sup>66</sup>

In order to break the impasse, President Clinton reiterated the importance of negotiating a treaty to freeze the production of fissile materials for use in nuclear weapons as he addressed the 51st UN General Assembly on September 24, 1996, calling upon the CD to take up the challenge of negotiating a fissile material production cut-off treaty "immediately."<sup>67</sup> The CD's response was paralysis.

So, despite the optimism engendered by the end of the Cold War, cutoff negotiations never got off the ground and became mired in a complex weave of other disarmament and international security issues. Why this occurred and potential alternatives will be discussed. But the fact remains that the failure to quickly negotiate a cutoff treaty banning the production of fissile materials is one reason the world community continues to face a growing proliferation threat.

#### **Current Status: Paralysis in the Conference on Disarmament**

Support for the FMCT is seemingly quite widespread; despite that, however, doubts persist on account of differing perceptions of the ban and hopes from such a ban. Variance in the interests and priorities of the countries is quite obvious. This is not typical of the haves and the have-nots as such. Differences continue to exist regarding the purpose, scope and verification of such a ban. Three tough issues remain stumbling blocks to a successfully negotiated FMCT. These are:

1. Differences over the scope of a cut-off verification regime, including especially whether to use that regime as a means to equalize the safeguards burden between the NWS and NNWS parties to the NPT.

2. Differences over how cut-off negotiations should handle past production and existing stocks of weapon useable fissile materials.
3. Convincing key countries, including such critical countries as India, Pakistan and Israel as well as the five NWS, that a FMCT is in their political/security interests or, barring that, determining whether a cut-off must be universal from the start.

Rebecca Johnson, writing in the September 1996 issue of *Disarmament Diplomacy* presciently warned that "there are fissile materials issues which should be discussed multilaterally, but the basic cutoff which the P-5 (the NWS) are prepared to consider at present would be neither an efficient use of CD time, nor could it deliver effective international agreement any time soon or guarantee India's early signature."<sup>68</sup> Four years later the NWS and Threshold States are arguably even farther away from achieving a negotiating mandate.

In the context of the current state of play, it is useful to examine the positions of other key countries in order to understand the lack of progress, why any future progress in the CD is unlikely, and why it is probably time to pursue other avenues for achieving our nonproliferation goal of capping fissile material production.

*The Other Nuclear Weapon States: Great Britain, France, China and Russia:* Great Britain ended HEU production for weapons in 1963, in part because it obtained the material from the United States. Then, on April 18, 1995, Britain announced an end to all fissile material production.<sup>69</sup> Though it gives support to the concept of an FMCT, it does so hesitatingly, because it has reservations about intrusive verification measures. Both Britain and France, while they are prepared to support the mandate, do not want existing stocks to be considered, particularly because of the perceived high cost and trouble associate with placing their nuclear facilities under international safeguards. They also reject the practical notion of an interim cut-off agreement solely among the nuclear weapon powers. For them the primary benefit of an FMCT is to put the threshold states under full safeguards.<sup>70</sup>

Plutonium production for France ended for military purposes in 1992 while its military enrichment facilities were scheduled for closure in 1995. France announced that it no longer produced fissile material for use in nuclear weapons in February 1996.<sup>71</sup> France is hesitant about the cutoff because of fear of intrusion. Consequently, to seek an immediate ban on civilian reprocessing as a part of a FMCT would be unrealistic since France, Britain, Russia and India would all adamantly oppose any such broadening. States with civilian plutonium activities should be pressed, however, to at least dispose of all but minimum working stocks of separated plutonium. This was one of the original objectives of the Vienna-based negotiations of International “Guidelines for the Management of Plutonium.” Unfortunately, these negotiations yielded only a vaguely worded, lowest-common-denominator commitment to “the importance of balancing supply and demand, including demand for reasonable working stocks for nuclear operations, as soon as practical.”<sup>72</sup>

HEU production in China for weapons reportedly ended in 1987. It objected to a cutoff in April 1994 but agreed to work with the United States for a cutoff ban in October 1994. Several factors will come into play in China's eventual decision, and it is a long road between beginning negotiations and final signing of a treaty. Experts believe that China is not producing fissile material for weapons currently and that it has converted its uranium-enrichment facilities from military to civilian production, both to provide fuel for its budding nuclear power industry and for export.<sup>73</sup> If this is true, it indicates that China has a stockpile of fissile material on hand for weapons. Alternatively, others believe that China's current obstructionism in the CD is due in part to a desire to increase its current stockpile of fissile materials in order to modernize and expand its nuclear arsenal.<sup>74</sup> Arguably, China is the real key to the ability of the CD, or any other forum for that matter, to negotiate an FMCT. A major incentive for the declared nuclear weapon states to an FMCT is to obtain the participation of the undeclared states. But India will not sign unless China does, and Pakistan will not sign unless India does.

So without China to bring in India and Pakistan, the cutoff may not get far off the ground.

China's interest in a cutoff convention will depend in part on whether it judges its stockpile to be adequate for its current weapons and for potential future needs. China's perceived need for larger and/or more capable nuclear forces will in turn depend on the actions of the other nuclear weapon states. For example, the United States is developing missile defenses intended to intercept much longer-range missiles than current systems. In response, China has recently issued a number of strong public objections to U.S. intentions on building a national missile defense (and possibly abrogating the Anti-Ballistic Missile Defense (ABM) Treaty), saying that such defenses could render China's small arsenal of strategic missiles "completely ineffective" and leave China open to blackmail.<sup>75</sup> If China continues to be concerned about U.S. (and possibly Russian) plans to deploy new missile defenses, it may want to maintain the option to expand and modernize its arsenal to be able to overwhelm such defenses; a fissile material production cutoff may then not be in China's interest.

China may also be concerned that a cutoff convention would give unfair advantage to the United States and Russia. China may believe that a cutoff agreement would only be fair and of practical significance if the United States and Russia first greatly reduced their large existing military stocks of fissile materials, as well as their large numbers of deployed nuclear weapons.

On the other hand, an FMCT would certainly benefit China with respect to the threat posed by India's nuclear weapons program. India's nuclear infrastructure is large enough that it could possibly out produce China in the future if it desired. This concern might provide an incentive for China to sign a cutoff deal that includes India, since India's signature on such an agreement would freeze that country's nuclear weapons program in an inferior position.

Another deciding factor for China will be how compliance would be verified. Verification will necessarily include international monitoring measures that would require each state to establish an accounting system for

its fissile material and to submit to on-site inspections to determine the accuracy of this system. Challenge inspections allowing inspectors to "go anywhere and anyplace" will also be a part of the verification scheme. China has traditionally been opposed to intrusive verification measures, but its attitude appears to be evolving. Although China repeatedly expressed concerns about the challenge inspections that were included in the Chemical Weapons Convention, for example, China did sign that accord.

China's interest in signing a cutoff convention will also depend on the expectations of other countries. It has become increasingly important to China to be viewed as a responsible member of the "nuclear club." Indeed, in the last several years, China has signed on to a number of international arms control agreements that it previously avoided or even denounced, including the NPT. Although it may prefer that such agreements not require any sacrifice or impose constraints on its military programs, China does appear willing to accept such constraints when not doing so would seriously damage its international reputation.

One of the major problems is that almost half of the CD delegations are pushing to start discussions on nuclear disarmament and outer space arms control,<sup>76</sup> and China is leading the charge. China did not confirm that it considered FMCT as the next practical step on nuclear disarmament, a position it had agreed to at the 1995 NPT Review and Extension Conference. Instead, China is now pressing hard on negotiating an arms control in outer space agreement, and it has received support from Russia on its position to establish an ad hoc committee to do so.<sup>77</sup> Now in addition, China, primarily because of its stated concerns over a prospective American national missile defense, has harshly criticized the United States and its allies in the CD, and essentially threatened to hold FMCT talks hostage unless the U.S. foregoes its missile defense plans.

In response, the U.S. reiterated that its "first priority remains the negotiation of a fissile material cut-off treaty (FMCT)" and regretted that China "will not permit the CD to negotiate on FMCT unless there are parallel

negotiations on nuclear arms reductions and outer space." Grey reminded the CD that China had subscribed to the 1995 NPT "Principles and Objectives" document that identified an FMCT as the next practical step in nuclear disarmament. "Here in the CD the United States has already shown considerable flexibility on important elements of our program of work.... If the CD does not get down to work, it will confirm my authorities' suspicions that this is because some governments do not want it to work."<sup>78</sup> The Russians initially supported the early commencement of FMCT negotiations stating they were "convinced that that the next step in enhancing the international non-proliferation and disarmament regime should consist" of a FMCT,<sup>79</sup> but later reversed themselves and supported the Chinese position that FMCT negotiations will not proceed unless there are parallel negotiations on nuclear disarmament and outer space.

*The Threshold States: Israel, India and Pakistan:* Israel, long suspected of having or quickly capable of having nuclear weapons, continues plutonium production at its nuclear facility in Dimona. There has been no official statement/discussion on their views of a proposed cutoff agreement. However, the general Israeli view is that if the FMCT and related verification systems do not reveal past activities and capabilities, thereby leaving the Israeli capability ambiguous, it may be acceptable. Israel would probably accept a freeze on stockpiles if this was accepted by all the states in the region and if verification was serious, based on mutual inspection, and not by the IAEA or another international organization of doubtful effectiveness. However, if the version of the FMCT that emerges includes revelation or destruction of existing stockpiles, Israel will not accept it.<sup>80</sup>

Israel stated at the CD that it will not oppose the establishment of an ad hoc committee to begin negotiations of an FMCT.<sup>81</sup> However, its general position has not wavered since 1993 where it stated at the UN that stopping or capping fissile material production is inextricably linked to the establishment of a Nuclear Weapons Free Zone in the Middle East. And such a Zone can only be achievable when a viable and stable peace agreement has been

achieved among all nations in the region (including Iran and Iraq) and tested over time. Israel is clearly not interested in signing up to any proposal for an FMCT at this time. Since the primary purpose of this Treaty is to capture the threshold states, absent a fundamental change in the current climate in the Middle East, the FMCT will either be held hostage to the Middle East peace process or it will have to go forward without Israeli participation.

Though it rejected a regional cutoff, India initially supported a global cutoff, without the inclusion of civilian stockpiles or production. Since India's production flows from its civilian program, it could be impossible to differentiate it from military production. Further, India has insisted on linking FMCT negotiations to a timetable for nuclear disarmament by the NWS. The Indian position was that the country might endorse the FMCT provided the CD stuck to the mandate as given by the UN General Assembly in 1993. New Delhi's reading of the UN mandate was that "the FMCT must not be seen in the retrospective sense. It has to be viewed as a prospective measure that prohibits the future production of unsafeguarded material."<sup>82</sup>

Seen from the standpoint of India, the FMCT although considered to be a non-discriminatory disarmament measure, global in its reach and universal in its application, is so only in intent. In real terms it does not change the status quo nor does it in any way reduce the gap between the haves and the have-nots. As a disarmament measure, it will in effect disarm the threshold states while the other NWS would have available to them significant numbers of nuclear weapons for decades to come even if they dismantle their nuclear weapons under the START I and START II Treaties.

In 1997, India asserted it would not sign the FMCT and reiterated that though the country was totally committed to the use of nuclear power for peaceful purposes, it was not willing to close its nuclear options as the security of the country would continue to receive the topmost priority. India refused to sign the CTBT and NPT on the grounds they were one-sided and unfair to a developing country like India.<sup>83</sup> This assertion marked a new phase in the country's nuclear policy as it is for the first time that India has taken a position

on a proposed international treaty.<sup>84</sup> In the case of the NPT and CTBT, India's objections came only after their provisions were known. It was pointed out by a retired Indian diplomat that India did participate in the negotiations for the NPT and the CTBT but "in the case of the FMCT, with the Prime Minister's categorical rejection, one is not sure whether India will join other nations during the negotiating stage itself."<sup>85</sup> However, after the 1998 nuclear tests, India reversed itself and stated it now supported the establishment of an ad hoc committee in the CD for an FMCT. Nevertheless, it has demonstrated an obvious reluctance for the talks to get underway and has contented itself to let China, Pakistan and others lead the way in holding the FMCT hostage to other issues.

Pakistan supports the cutoff regionally as part of a bilateral NPT regime, and globally. It agreed to a mandate without a reference to stockpiles as long as stockpiles could be addressed in the talks but may not agree to inspection. Pakistan, however, made a concession of sorts in its approach to the negotiating mandate by saying that it could support the UN language which referred only to a ban on future production of fissile material provided that "this language does not preclude any delegation from raising the issue of the scope of the convention during the actual negotiations" and will reserve the right to ensure that "the question of asymmetric stockpiles" is considered.<sup>86</sup>

Pakistan argues that whereas India's nuclear tests had destabilized the "existential deterrence" which had operated between the two countries for almost twenty years, Pakistan's tests served to re-establish balance and stability.<sup>87</sup> During recent discussions, Pakistan and the United States agreed to support the immediate commencement of negotiations on a non-discriminatory, universal and effectively verifiable treaty banning the production of fissile material for nuclear weapons and other nuclear explosive devices.<sup>88</sup> However, Pakistan continued to raise the issue of "unequal" stockpiles citing the wide disparity in fissile material stockpiles of India and Pakistan. Stockpile asymmetry will remain a stumbling block for Pakistan and will make it difficult for them to accept a ban on future production only. And,

as evidenced by its delegation's behavior in the CD, Pakistan is, for the most part, taking an obstructionist position stifling any chance for progress on an FMCT in the CD.<sup>89</sup>

Similar to Israel's attitude, resolving the dispute over Kashmir is the key to resolving the security crisis in South Asia. Kashmir was the fundamental issue influencing nuclear decision-making by both Pakistan and India, and it will weigh heavily on Pakistan during negotiations of the parameters of a possible FMCT. The solution to that problem will be the true first step towards Pakistan and India's cooperation in agreeing to fissile material production cutoff and other nonproliferation measures.

*The "Non-Aligned Group of 21" (G-21):* The G-21 has repeatedly emphasized that nuclear disarmament should be the highest priority for the Conference on Disarmament (CD) but has generally endorsed efforts to establish a FMCT negotiating committee. It has not tried to link talks on nuclear disarmament to the FMCT, as China has done, but has "insisted that the existing stocks should be part of the negotiating mandate."<sup>90</sup> The Group also is noted for stating that the primary purpose of an FMCT should be disarmament, vice nuclear non-proliferation, since it will serve as an integral step leading to the eventual total elimination of nuclear weapons.

The CD adopts its work program every year by consensus. This is a requirement that encourages all kinds of linkages and hostage taking. Sometimes the linkages are relevant, but the knowledge that the United States or another NWS will reject substantive work on an issue such as nuclear disarmament or outer space means that linkages can also be a convenient way of delaying substantive work. While requiring consensus before work can proceed protects U.S. interests from falling prey to the tyranny of the majority, it can also, as demonstrated in this case, block progress on substantive work that the vast majority are in agreement with. So it is now as the Chinese argue that the CD program of work must have a balance between the three issues of FMCT, outer space and nuclear disarmament with an outer space treaty being negotiated first before proceeding with FMCT. And further, the CD serves as

a convenient grand stand for China, Russia and others to criticize the United States for developing a national missile defense and throwing further U.S. efforts in that regard as a block to negotiating an FMCT.<sup>91</sup>

Despite the current deadlock in the CD, work has continued by the U.S. and other like-minded states with the IAEA on examining the issues and problems with establishing a verification regime for a future FMCT. Indeed, of all the substantive issues to be negotiated, this will easily prove to be the most difficult and contentious.

#### **Verification and the Role of the IAEA**

During full-fledged negotiations, the verification aspect of a fissile material cutoff agreement is very likely to prove one of the most politically difficult and, in varying degrees, technically complex issues. Two questions that immediately stand out, which are closely related but separate are: what should be the role of the IAEA in cutoff verification? And what overall verification approach or architecture should guide crafting of a cutoff verification regime? In deciding whether to follow a comprehensive or streamlined approach towards verification, efforts must be made to contain perceptions of unfair discrimination between non-nuclear and nuclear countries as well as to avoid major inconsistencies between traditional IAEA verification and that of a cutoff convention.

One of the more difficult questions for any FMCT proposal will be the scope and extent of verification of compliance. Related is how such provisions will affect—and be affected by—existing control systems that also focus on the production and use of fissile materials. The most obvious is the application of IAEA safeguards. In particular, differences in the scope of coverage, the verification objectives, the measures and technology applied, and the evaluation methods and reporting may arise. Obviously, if the FMCT should become a reality, efforts to rationalize overlapping requirements will be necessary and implementation will have to be carried out in such a manner to assure that IAEA safeguards and the FMCT verification regime are mutually

complementary, and that the final outcome assures that the totality of verification undertakings is effective and efficient.

The IAEA has, from its inception, been the instrument of governments to verify that the peaceful use commitments made under the NPT are kept—performing what is known as its "safeguards" role. The Agency's mandate is to ensure that assistance provided by it or under its supervision or control is not used in such a way as to further any military purpose. For over forty years the IAEA has, for the most part, successfully served to provide a strong and impartial system to verify that countries are meeting their non-proliferation obligations. It is significant that no diversion of any significant quantity of nuclear material placed under safeguards has been detected. The discovery of a clandestine nuclear weapons program in Iraq demonstrated, however, the serious limitation of the ability of the safeguards system to detect possible undeclared nuclear activities. This has resulted in the passage and implementation of an additional protocol to the safeguards agreement that provides for a number of intrusive measures and techniques to increase confidence that there is no diversion or an undetected illicit nuclear weapons program.<sup>92</sup>

Pursuant to the UN General Assembly Resolution, the IAEA was requested to provide technical assistance in developing "verification arrangements" for a proposed FMCT. While the IAEA has not been designated, nor is it likely to be so designated until a FMCT is being negotiated, the IAEA's experience and expertise will likely be put to use in developing a verification regime to supplement and complement the other bilateral and multilateral arms control and nonproliferation measures to store, safeguard, and ban the further production of fissile materials for weapons use.<sup>93</sup>

Verification of compliance with a proposed FMCT will not be without its difficulties. Fortunately, the IAEA has the vast experience and potential capability to serve as the verification instrument for an FMCT. The IAEA negotiates and implements "safeguards" agreements in which states

undertake to submit all nuclear material to IAEA oversight and includes an undertaking not to develop or otherwise acquire nuclear materials for weapons purposes. IAEA verification activities are directed at the detection of diversion of significant quantities of nuclear material from peaceful uses to the manufacture of nuclear weapons (or for any other purpose) and to verify the correctness and completeness of the declarations made by states, to include the objective of detecting undeclared production of fissile materials anywhere on the territory of the state or under its control.<sup>94</sup> The IAEA is continuing to pressure states with great success to sign the additional protocols.<sup>95</sup> Obviously, a state's commitment to a safeguards agreement along with the additional protocol will be an important consideration in applying verification provisions of an FMCT to such a state.

The IAEA has a number of other relevant experiences that could be applicable to FMCT verification activities. These include the experiences gained in carrying out extended verification measures in Iraq under the provisions of UN Security Council resolution 687, monitoring a freeze on operations in facilities in the DPRK to include monitoring a freeze on operations at a reprocessing plant, and participation with the Russian Federation and the United States in developing a verification system for excess defense fissile materials in those states, including provisions for terminating verification of weapon-origin plutonium. The experiences gained in these situations may be of benefit in considering the rights and obligations of parties to a possible FMCT.<sup>96</sup>

It is important to highlight the fundamental difference between verification arrangements under the NPT and the FMCT. Full-scope NPT safeguards are designed for states in which all nuclear material is safeguarded and which have undertaken a comprehensive commitment not to receive, manufacture or otherwise acquire nuclear weapons. The FMCT is designed to proscribe production of fissile material for nuclear weapons or other nuclear explosive devices by states that already have or may have nuclear weapons;

thus, not all nuclear material would need to be subject to safeguards in the NWS and the threshold states.

Proponents of a more comprehensive verification regime argue that it would foster greater transparency among the five NWS, lessen mutual suspicions among them, and enhance wider confidence in their compliance. At root, however, their advocacy of this approach reflects a strong underlying political interest in equalizing the burden of safeguards. In effect, the regime would be designed not simply to monitor the shutdown of production activities related to nuclear weapons, but to bring under international inspection all non-military nuclear activities in the NWS. It would monitor any residual production of plutonium and HEW as well as the status of former production plants and spent fuel.

On the other hand, the rationale for applying less than comprehensive safeguards under a FMCT can be summarized as follows: the existence in the NWS (and threshold states) of unsafeguarded stocks, produced prior to entry into force, which rules out fully comprehensive safeguards; the practicalities that the cost in absolute terms would have to be increased at least threefold relative to current IAEA levels to apply comprehensive safeguards, and the need to keep the inspectorate to a manageable size; and cost-effectiveness (the cost in terms of strategic benefit gained); specifically, does a comprehensive approach yield significant additional benefits in proportion to the extra cost over a focused approach?

At the other end of the spectrum to a comprehensive verification regime, some have proposed that the scope of the FMCT should be limited to weapon-grade material. The proponents consider this would be the most cost-effective approach. It is not clear however that significantly fewer inspections would be needed at enrichment and reprocessing plants to determine that there had been no production of weapon-grade material, relative to verification of production of weapon-useable material (discussed below). More importantly, it is of major concern that such a limited scope would undermine the critical purpose of the FMCT and undercut long-standing international standards in

safeguards. The barriers to possible breakout would be substantially reduced because of the possibility of rapid upgrading of weapon-useable material to weapon-grade, or even the use of such material in sub-optimal nuclear explosive devices.

A more streamlined verification approach would concentrate on monitoring declared enrichment and plutonium production facilities, including shutdown facilities. Rather than monitoring the full fuel cycle, it would track any production of PU or HEU up to the point that such materials were used for permitted civilian nuclear purpose. It would rely on challenge inspections to detect undeclared facilities or diversion of materials from declared enrichment or reprocessing facilities producing materials for civilian purposes or non-proscribed military purposes, such as naval reactor fuels. This is similar to what the United States is proposing.

The FMCT verification proposal preferred by the US has raised concern because it would apply much less stringent verification requirements to the civilian nuclear energy sectors of the NWS than are required of NNWS. The US favors a verification regime focused narrowly on:

1. Uranium enrichment plants, to determine whether or not HEU is being produced;
2. Spent fuel “reprocessing “ plants at which PU or other artificial fissile isotopes made by neutron absorption can be separated from highly radioactive fission products; and
3. Fissile materials produced after FMCT comes into force and the facilities in which these materials are present.<sup>97</sup>

This regime would be supplemented by challenge inspections involving managed access to suspect sites.<sup>98</sup>

Realistically, given the large number of facilities to which safeguards will have to be applied and the large number of expert personnel that will be required, international monitoring in the NWS will have to be implemented in stages. The narrow coverage favored by the US is an obvious first step, particularly when one considers the funding difficulties. Coverage could later

be expanded as practicable until it is as comprehensive outside declared military nuclear facilities as the coverage accepted by the NNWSs. Conceivably, even declared military nuclear facilities will have to be eligible for challenge inspections to verify that they do not contain clandestine reprocessing or enrichment facilities. All facilities in the NNWS that have accepted the Additional Protocol are already subject to managed access challenge inspections by the IAEA. Managed access arrangements allow inspected countries to provide information required by international inspection teams while protecting sensitive military or proprietary information.

Cost and who will pay the cost will be a complex and difficult issue. A 1995 IAEA comparison of the annual cost of full verification of separated fissile material and facilities capable of producing such materials was \$90 million, only one-third less than the estimate of \$140 million per year for full safeguards on all civilian facilities in the NWS.<sup>99</sup> While most agree that in the event there is an FMCT the IAEA is the ideal agency to serve as the verification instrument, unfortunately, the IAEA, in its present financial condition, will be unable to fulfill any such role unless the states parties agree to full funding to support these additional costs. The IAEA budget has remained at zero-growth for more than ten years, even as additional mandatory verification activities have arisen in South Africa, Argentina and Brazil, and in the newly independent states of the former Soviet Union. All five nuclear weapon states have entered into limited scope voluntary safeguards agreements in order to provide more openness and transparency to their activities.

The safeguards operations budget of the IAEA in 2000 was over \$80 million.<sup>100</sup> It would be almost tripled to \$200 million/year for the most costly comprehensive FMCT verification approach considered in the 1995 IAEA working paper. This \$140 million increase would be tiny, however, in comparison with the operational cost savings realized by the NWS as a result of shutting down their fissile-material production complexes. From 1984 through 1993, the United States alone spent about \$2 billion per year on

plutonium production for weapons. From 1954 through 1963, before the United States ended the production of HEU for weapons and began shutting down many of its plutonium-production reactors, the annual American rate of expenditure for the production of fissile materials for weapons averaged about \$7.billion.<sup>101</sup> If the IAEA is to serve as the instrument for verification, member states will have to commit additional funds to support taking on these additional responsibilities. As the Director General of the IAEA frankly observed, the IAEA's plate is full and it is incapable of taking on more missions without a funding to support those missions.<sup>102</sup>

However, experts readily acknowledge that, as the UN experience in Iraq after the Persian Gulf War has demonstrated, the ability to detect small-scale clandestine production programs will be extremely low.<sup>103</sup> The primary emphasis of any verification, monitoring, and transparency regime should be on increasing the costs and raising the risks of non-compliance, thereby adding to deterrence, while limiting exposure to classified programs and proprietary information or existing nuclear weapons programs of the NWS. A key question in negotiating such a regime will be the degree to which the NWS are willing to accept the burdens associated with implementing a cutoff agreement in order to promote their nonproliferation objectives.

The United Nations mandate calls for an effectively verifiable agreement. While not defined, this generally means there is a high degree of certainty that cheating would be detected. Unfortunately, while the technology continues to improve, it is unlikely that the IAEA or anyone else will be able to detect with high confidence the clandestine production of fissile materials either at an undeclared site or undeclared production at a declared site. The experience of the IAEA with Iraq and North Korea where two NPT parties with safeguards agreements were able to cheat despite being subject to IAEA inspections is telling. Despite technological improvements and a more intrusive safeguards regime, it is highly unlikely a clandestine program could be detected in states determined to cheat. In some regions, verifiability of the agreement could be crucial. For example, if a cutoff agreement were in effect,

any country that secretly produced fissile materials could gain a substantial advantage over others. In both the Middle East and South Asia, it will be critical that countries have strong confidence that their neighbors are not clandestinely producing fissile materials. It is fair to say that currently any of the proposed verification regimes could not give such assurances, and a financially hamstrung IAEA certainly would not be able to certify convincingly that a FMCT state party is in compliance.

#### **ALTERNATIVE APPROACHES: POTENTIAL OPTIONS IN THE FACE OF A DEADLOCKED CONFERENCE ON DISARMAMENT**

Since there is no progress and no hope of any movement in the near future in the CD, there are a number of other possible alternatives worth examining in pursuit of our nonproliferation goals vis-à-vis fissile materials.

Recently, in an attempt to break the deadlock, the CD hosted a conference where a number of ideas were put forth on the scope of a potential FMCT. The options presented to the conference included: 1) the basic FMCT, which would simply ban future production of plutonium and HEU for weapons; 2) the basic FMCT plus added requirements that any fissile materials declared excess to military needs be placed under irreversible IAEA safeguards, and 3) the FMCT plus option 2 with an added provision that *all* fissile material from warheads removed from deployment by the several missile-reduction treaties, the Bush-Gorbachev/Yeltsin reciprocal cuts, and any future agreements be placed under IAEA safeguards.<sup>104</sup> The technical requirements for verification would obviously vary depending on the scope of the prohibition.

Most of the technical discussion focused on the basic FMCT ban. Even for that basic ban, there were important technical problems meriting discussion. These included how to safeguard HEU fuel for propulsion of naval vessels and how to safeguard old separation or enrichment plants not designed to be safeguarded.<sup>105</sup> While no consensus was sought at this technical conference, there seemed to be general agreement that an FMCT would probably start with the basic ban.<sup>106</sup>

Absent any agreement in the CD, the U.S. should continue to focus on its bilateral initiatives with Russia (after all, Russia and the states of the former Soviet Union are our greatest proliferation concern) and continue to cooperate and provide financial support to Russia to adequately safeguard and manage her fissile materials. The numerous initiatives discussed, supra, should continue to be funded and politically supported.

Second, no matter what happens with the FMCT, the U.S. and other countries with nuclear reactors need to develop a comprehensive strategy to deal with the proliferation risks associated with the growing use of plutonium as civilian reactor fuel. The U.S. should continue research on nuclear power technologies that are inherently more proliferation resistant and do not depend solely on safeguards to maintain security.

Finally, the U.S. should not rely solely on technological barriers to stop nuclear proliferation. As technology advances, it becomes easier and easier for states to develop nuclear weapons. The U.S. might be wise to pursue more front-end solutions to non-proliferation and try to develop policies that reduce the military and political incentives for states to develop nuclear weapons. Ultimately, especially in light of what's happened in the CD, this is the best and most effective way to increase global security.

Given the problematic nature of progress in the CD, the most effective way to make progress towards a fissile cutoff agreement in the foreseeable future will be most likely through incremental advances separate from the hopelessly deadlocked CD negotiations. The CD is probably, with now 66 members and counting, too unwieldy to be an appropriate forum for these negotiations. Rather, the better approach now would be to develop and pursue a series of confidence-building measures that would reinforce the commitments of those countries that have ceased production; increase transparency that these commitments are being met; and increase pressure on those states that do continue production.

At a recent Japanese-sponsored technical conference, the Australian representatives proposed a "phased approach" with a "framework agreement"

stating broad goals, but not legal obligations, for both the basic FMCT and for reductions in stocks that sounded promising.<sup>107</sup> The FMCT, a legally binding treaty, could then be negotiated separately from the agreements on reductions in stocks, that is, from the weapon reduction, dismantlement, and disposition agreements, many of which are already being negotiated in bilateral form between Russia and the United States. It seems prudent that the negotiation of these agreements should continue as they are for the time being and expand beyond bilateral (or trilateral) to five-party or larger talks as more necessary parties participate.

Cessation of production of nuclear weapons-usable materials directly concerns only the United States, Russia, Britain, France, China, India, Pakistan and Israel. All other state parties to the NPT are already under the obligation not to produce the materials in question, and are subject to comprehensive IAEA safeguards; they are not expected to assume additional non-proliferation obligations. It might, therefore, be expedient to cease linking the fissile material cut-off measure with other arms control measures and to negotiate it in a forum composed of the eight countries specified above, rather than at the CD composed of 66 countries. Other states would be involved, through the IAEA, in verifying compliance with the reached agreement, but only states directly affected by the agreement should bear the additional costs.

Another approach, suggested by Canada and others, argues for a broad spectrum of measures in which a ban of fissile material production would be only one element.<sup>108</sup> These measures are varied but usually revolve around four general categories:

1. Proposals to increase transparency;
2. Declarations of excess fissile material;
3. Verification measures to ensure fissile material cannot be diverted back into weapons; and
4. Safe and secure disposition of all excess fissile material.

The collection and release of information about the size of current fissile material inventories is necessary in addressing the issue of excess stocks. Aggregate quantities of stocks are needed as a baseline to measure the progress of establishing controls and disposition programs on these stocks. Accurate accounting of these stocks also serves an important disarmament and nonproliferation objective for each state possessing such stocks by ensuring that fissile materials have not been stolen or diverted. In that context, efforts to establish production histories will increase confidence that the measured inventories are correct.

Both the United States and the UK have released data about their stocks, and have promised to release more. France's nuclear program is regarded as having as sophisticated a nuclear material accounting system as the United States and the UK, and should, with relative ease, be able to compile and release similar information about its stocks. Little is known about the accounting systems used by China. Whether the Russian Federation has compiled or is now compiling this information is unknown. Russia still needs to develop a modern, nation-wide system to account for its fissile materials; it may be several years before one is developed. So, one supporting transparency measure might be to reach agreement among the five nuclear-weapon states to create, regularly update and publish information about their fissile stocks.

Another approach might be to not see a FMCT as a stand-alone instrument, but rather as a framework instrument which evolves over time into a comprehensive regime governing the production, stockpiling, management and disposition of fissile material. For this reason, the conclusion of a first treaty simply codifying a ban on the production of fissile material for use in nuclear weapons could be followed by a second agreement providing for greater transparency over fissile material inventories and gradually bringing fissile material stocks under strict and effective international control. This too should be an evolving instrument which tracks other nuclear disarmament measures and progressively brings direct-use fissile material into the scope of a fissile material regime. An important objective of this progressive approach

will be to make disarmament measures irreversible by ensuring that fissile material no longer needed is not available for military use again. This fissile material regime will require an innovative, multifaceted approach involving a balance of bilateral, multilateral and appropriate international and possibly regional arrangements for nuclear material made excess to military requirements.

Another alternative worth pursuing is to use the "trilateral initiative" model. The U.S., Russia, and the IAEA, as previously discussed, have worked together to create a verification arrangement, soon to be approved by the IAEA, for the management of excess fissile materials. The U.S. could work in tandem with the IAEA to progressively work with one or more of the threshold states to arrive at a similar arrangement that would capture currently unsafeguarded fissile material production and possibly even some already-produced stocks.

As the CD increasingly demonstrates its inability to get negotiations on an FMCT underway, perhaps the NWS should all walk away from the CD and begin a limited negotiation to develop the groundwork for a verifiable treaty banning the production of fissile materials. Again, this would be highly controversial, put the CD adherents in disarray, and possibly break the logjam. If China balked, as would be expected, it would risk losing the international support it needs to rally against U.S. national missile defenses. Political self interest combined with leverage by the international community for all the weapon states to fulfil the 1995 NPT priorities would make it difficult for China to pull out if the other four were serious about going ahead. Of course, it is highly speculative and conjectural that Russia would be interested (it has enough on its hands coping with its own fissile material problems without signing up to more international obligations) or that Great Britain and France would have the desire to pursue such a side-bar negotiation.

If the negotiations were non-polemical and low-key, it might provide a convenient forum for India and Pakistan to join and begin the tortuous process of working out their mutual national security concerns. Israel could

also be invited to join or at least observe. This exclusive club would have its detractors but it could do no worse than what is happening now at the CD. If and when the CD shows itself ready to negotiate, the fruits of the five's (plus three?) preparatory and technical negotiations could be transferred into the multilateral forum, although it would be very likely that these sidebar talks would continue in parallel, as during the CTBT negotiations.

Of course, there is the question of how much diplomatic effort should be devoted to the cut-off, that is, the multilateral global cut-off, if in fact there is substantial diplomatic opposition to it. How many resources, how much time should be devoted to this or perhaps, if it can't be achieved quickly and simply, we might have to move on to other measures that will have to be more effective. Indeed, while the suggestions posited here may have merit, absent the clear political will to arrive at an agreement all of these proposals are doomed to the same trash heap where the FMCT currently resides.

#### **CONCLUDING THOUGHTS: WHY THIS DOG STILL WON'T HUNT AND WHAT IT MEANS TO THE FUTURE OF THE CONFERENCE ON DISARMAMENT**

Perhaps the US expected too much from the CD given its success in negotiating a CWC and CTBT over the last ten years. Perhaps declaring an FMCT as its most important arms control priority in the CD gave others a reason to think that an FMCT was important enough that the U.S. would cave in its opposition to talks on nuclear disarmament, an arms race in outer space, and forego national missile defense. Given the vacillation of China, India and Pakistan it is hard to know for sure. As important as the nonproliferation agenda is, the FMCT never was of such import that the U.S. was willing to "pay any price or bear any burden" to ensure its genesis.

After five years of frustration both opponents and proponents of arms control have begun to question the viability of the CD.<sup>109</sup> Undoubtedly, the Conference on Disarmament (CD) is in crisis. This crisis offers both danger and opportunity. Certainly, the CD has not started negotiating anything since finishing the CTBT in August 1996. But does this signify the brink of terminal

decline, or a fallow time, when it is better that nothing be planted until the soil (political and structural conditions) has been replenished sufficiently to grow sturdy crops? Perhaps it would be best for the U.S. and other NWS to simply declare that no progress is possible and walk away from the CD. In the ensuing uproar, recalcitrant states may well find the political will to re-energize these talks.

On the other hand, as a result of no discernable progress after five years, one could convincingly argue that the Conference on Disarmament has lost its importance as a multilateral mechanism negotiating global arms control. The widely diverging opinions regarding the agenda of the CD reflect the impotence of this body, which cannot be cured by mere procedural gimmicks

Since it is exceedingly unlikely that any progress will be made in Geneva, the question is why continue? The CD is the bastion of multilateral arms control but the price is often too steep a price for the U.S. to pay in terms of protecting and preserving its national security interests. Few nations have much to lose in participating in negotiations over which they have nothing to give up. On the other hand, the U.S. will be constantly pressured to make concessions in the interest of moving the process forward. While certainly capping the production of fissile materials, particularly with regard to the threshold states, is an important national interest, it is not of such import to agree to negotiate away our nuclear deterrent or limiting our technological advantages in space and elsewhere. Indeed, the dynamics of the CD are such that it has more often than not become a forum for bashing U.S. national security policies, providing a convenient outlet for member states to vent their anger and frustration over real or perceived complaints about U.S. actions around the world. Since the discussions focus inevitably and almost exclusively on what the nuclear weapon states will give up in order to achieve their nonproliferation goals, members from the so-called non-aligned "Group of 21" and China, the "Group of One," hold hostage real progress in limiting or rolling back the spread of weapons of mass destruction. Consider, for

example, the recent statement of the Pakistani Ambassador to the CD where he stated that "The FMCT is not the highest priority for the Group [of 21]. The realization of nuclear disarmament enjoys the highest priority in our pantheon of the purposes of the CD."<sup>110</sup>

Further, the CD, as the sole multilateral, continuously standing negotiating forum on disarmament, serves as a convenient stage to excoriate the West or highlight regional disputes. Invariably, in our desire to achieve an agreement in this forum, the costs may be too great to bear for the benefits to be gained. Consider the prescient warning issued this year by the U.S. Ambassador to the CD, Robert Grey:

What happens next is up to us. The CD will have no trouble maintaining its role as the world's single multilateral negotiating body if we do what is expected of us: negotiate multilateral arms control and disarmament agreements that contribute to the security and well being of humankind. We need to focus on what is possible now, not seek perfect, all-encompassing solutions to disarmament. We also need to resist the urge to score political debating points or involve the CD in issues it cannot address effectively. If we can do this, members of the CD will have no trouble keeping it relevant and engaged. If not, those who seek progress on disarmament will look elsewhere.<sup>111</sup>

While obtaining an agreement that creates an international norm proscribing the future production of fissile materials is a worthwhile nonproliferation goal, forcing the United States and its allies to give up or degrade its ability to deter or effectively respond to a proliferation threat to international peace and security is too large a price to pay. Indeed, as one observes the ongoings of the CD, it calls into question the efficacy of future multilateral arms control negotiations, particularly where it has little, if any, impact on reducing the danger under negotiation and increasing the risk of vulnerability based on the costs imposed.<sup>112</sup> And, as we have discussed, despite the increasing sophistication of the IAEA's monitoring and verification capabilities, it is undeniable that a determined proliferator will be able to

acquire fissile materials or even generate a clandestine program to produce such materials.

Indeed, the shortcomings that plague this initiative, in conjunction with a changing global environment and rapidly developing technologies, call into question the ability of arms control to favorably influence the security environment and have drawn into question their value to U.S. interests. The attractions of disarmament seem obvious yet remain almost impossibly difficult to achieve. Hans Morgenthau, source of much of our international-relations wisdom, half a century ago taught that the focus on disarmament was misplaced; it was aimed at a symptom rather than a cause. "Men do not fight because they have arms," he wrote. "They have arms because they deem it necessary to fight." Solve the political problem that is tending toward war, and then disarmament becomes achievable. "Disarmament or at least regulation of armaments is an indispensable step in a general settlement of international conflicts," wrote Morgenthau. "It can, however, not be the first step."<sup>113</sup> In fact, this is exactly the position the Threshold States have taken in describing their reluctance to give up or cap the production of fissile materials.

Arms control can be no more than a tool of national strategy if it is to be effective. It is an alternative to the other tool, the deployment of weapons. But it must pursue the same goal of national security strategy: to enhance security at the lowest possible cost and risk. When arms control becomes an end in itself the consequences become manifest: increased costs and more risk. Our arms control and nonproliferation efforts must remain grounded in the single-minded purpose of enhancing the security of the United States and international peace and security generally. Otherwise we will have less security not more as we sign up to arms control or nonproliferation agreements for the sake of having such agreements even if they are unable to provide the security for which they were intended.

If we are serious about stopping the spread of fissile materials to countries of proliferation concern, the U.S. should focus less on arms control and more on the underlying reasons for why countries want to acquire and use

such materials. Instead of trying to find the right mix of arms control carrots and sticks, it would be more worthwhile to pursue policies that attempt to alleviate the political, economic, ethnic and religious differences and disparities from which these desires lie. These are often aggravated by governance-related deficiencies such as exclusionary and repressive policies, and lack of, or weaknesses in, democratic institutions, respect for the rule of law, and human rights observance. Once the reasons for these illicit programs disappear, the negotiations to end and roll back these programs, as was the case in South Africa, will become trivially easy.

The threat of fissile materials will end once countries give up bankrupt regimes with repressive policies and embrace the rule of law. Historically, democratic states do not fight each other and do not pose proliferation risks.<sup>114</sup> National security decisions will conclude that disarmament is appropriate once perceived threats to national security recede and not before. Perhaps it's time the CD focused on the disease of proliferation and less on its symptoms. Unfortunately, lacking a mandate to do so, the CD will remain an exercise in futility, albeit one that keeps a huge number of diplomats employed. In any event, a cutoff treaty must await a new political climate before the parties of proliferation concern ever agree to give up fissile materials, an important element to their perceptions of national security.

## NOTES

---

<sup>1</sup> For the purposes of this discussion, the term “fissile materials” used here will refer to weapons grade HEU or plutonium. As such, fissile materials are those nuclear materials that could be used in the manufacture of nuclear weapons or other nuclear explosives without reprocessing or further enrichment, and material that would require irradiation or enrichment to make it suitable for use in nuclear weapons. Unlike uranium, plutonium of virtually any composition of isotopes can be used for a nuclear weapon. Weapons fueled by plutonium with lesser amounts of plutonium-239 (low grade or reactor grade plutonium) will not be as powerful as those fueled by weapons-grade plutonium, but they will still yield sizeable explosions. Interestingly, no definition of fissile material has yet to be proposed for the purposes of a fissile

---

material cutoff treaty although it is commonly understood to minimally include plutonium and uranium that contains at least 90% of uranium 235.

<sup>2</sup> General Assembly Official Records (GAOR), session 48, plenary mtg. 4th, September 27, 1993, 7. The term “weapons of mass destruction” is used here to describe nuclear, chemical or biological weapons and their means of delivery.

<sup>3</sup> UN General Assembly, 48<sup>th</sup> Session, Resolution 45/75L, adopted without a vote in December 1993. See also, USIS Fact Sheet, November 7, 1996, New Delhi.

<sup>4</sup> Steve Fetter and Frank von Hippel, "A Step-by-Step Approach To a Global Fissile Materials Cutoff," *Arms Control Today* 25:8 (October 1995): 5.

<sup>5</sup> These include the unilateral U.S. fissile material initiatives to submit fissile material excess to U.S. defense needs to International Atomic Energy Agency (IAEA) safeguards; the trilateral initiative with the IAEA and Russia to establish verification measures for nuclear material excess to defense needs; bilateral cooperation with the Russian Federation and the New Independent States (NIS) on nuclear materials security; a bilateral agreement between the U.S. and Russia on cessation of plutonium production for weapons; efforts related to the disposition of plutonium and highly enriched uranium (HEU) designated as no longer required for defense purposes, the management of the civil uses of plutonium; the management of HEU in research and test reactors; and the management of spent fuel of the Democratic People's Republic of Korea.

<sup>6</sup> The Conference on Disarmament (CD), established in 1979 as the single multilateral disarmament negotiating forum of the international community, was a result of the first Special Session on Disarmament of the United Nations General Assembly held in 1978. It succeeded other Geneva-based negotiating fora, which include the Ten-Nation Committee on Disarmament (1960), the Eighteen-Nation Committee on Disarmament (1962-68), and the Conference of the Committee on Disarmament (1969-78).

As originally constituted, the CD had 40 members. Subsequently its membership was expanded to 66 countries. While not technically a part of the United Nations Organization, its budget and personnel are included in the UN organizational structure. The Conference conducts its work by consensus, and its terms of reference include practically all multilateral arms control and disarmament problems.

<sup>7</sup> William Cohen, *Proliferation: Threat and Response* (Washington D.C.: Office of the Secretary of Defense, November 1997), iii.

---

<sup>8</sup> See J. Carson Mark et al., "Can Terrorists Build Nuclear Weapons?," in Paul Leventhal & Yonah Alexander, eds., *Preventing Nuclear Terrorism* (Lexington MA: Lexington Books 1987), 60-62; J. Carson Mark, *Reactor-Grade plutonium's Explosive Properties* (Nuclear Control Institute, August 1990); "U.N. Official: Iraq Worked on Radiological Arms," *The Washington Post*, 8 November 1995, 25.

<sup>9</sup> For a comprehensive assessment of this problem see Graham Allison, et al., *Avoiding Nuclear Anarchy*, (Cambridge, Mass: MIT Press, 1996); Guy Roberts, "Five Minutes Past Midnight: The Clear and Present Danger of Nuclear Weapons Grade Fissile Materials," *INSS Occasional Paper 8*, (US Air Force Academy, Co: INSS, 1996).

<sup>10</sup> Adam Bernstein, "Getting Burnt by Weapons Plutonium: Security Implications of US Disposition Options," *The Nonproliferation Review* 4:2 (Winter 1997): 72.

<sup>11</sup> Blending down HEU is essentially the process of diluting uranium-235. This involves mixing HEU with LEU so that the concentration of uranium-235 is low enough that the resulting uranium is not suitable for weapons. HEU may be blended down into LEU that is usable in power-generating reactors, but not suitable for weapons. The process of blending HEU down into LEU is relatively simple, but the process of getting HEU back again is very difficult: LEU would have to be enriched all over again to obtain HEU.

<sup>12</sup> John H. Gibbons, "Plutonium and International Security," Statement before the Committee on Energy and Natural Resources, United States Senate, May 26, 1994, 3.

<sup>13</sup> David Albright, Frans Berkhout, William Walker, *World Inventory of Plutonium and Highly Enriched Uranium*, 1992, (Stockholm; SIPRI, 1993). See Table 12.1, page 197 and Table 12.8, page 205 which show that separated weapons-usable plutonium in civil fuel cycles is projected to exceed the amount in the world's military stockpiles by the turn of the century.

<sup>14</sup> Albright, Berkhart, Walker, *supra* note 13, at 327.

<sup>15</sup> The intent here is simply to highlight the potentially much more severe and global problem of reactor-grade plutonium and HEU. Addressing the stockpiles of plutonium from civil reactors is a problem that is not being addressed initially by the proposed FMCT where the focus is on capping the production of fissile materials for weapons purposes. However, since civilian reactors are producing so much more plutonium, it is not worthwhile to invest significant resources in safeguarding these materials "unless and until society is also prepared to reduce further the accessibility of civilian plutonium in

---

spent fuel." Bette Hileman, "Nuclear Arms Dismantling: NAS urges steps to safeguard plutonium," *Chemical & Engineering News*, 31 January 1994, 6.

<sup>16</sup> According to the Natural Resources Defense Council, the total plutonium inventory is approximately 100 tons, of which 86 tons are weapons grade. According to the Department of Energy, the United States produced 994 tons of HEU between 1945 and 1992. See Thomas B. Cochran, "Dismantlement of Nuclear Weapons and Disposal of Fissile Material from Weapons," paper presented to the 45<sup>th</sup> Pugwash Conference on Science and World Affairs, Hiroshima, Japan, July 23-29, 1995, 4-5.

<sup>17</sup> Paul Leventhal and Daniel Horner, "NPT Extension Should Not Ignore the Dangers of Plutonium," *Disarmament Times*, 22 November 1994, 1.

<sup>18</sup> Approximately twenty-two countries possess or control separated plutonium either for military or commercial use. See David Albright, Frans Berkhout and William Walker, *World Inventory of Plutonium and Highly Enriched Uranium* (New York: Oxford University Press, 1997).

<sup>19</sup> Noboru Oi, "Plutonium Challenges: Changing Dimensions of Global Cooperation" at <http://www.iaea.org/worldatom/Periodicals/Bulletin/Bull401/article3.html>.

<sup>20</sup> *Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Excess Plutonium Disposition Alternatives*, U.S. Department of Energy Report DOE/NN-ooo7, January 1997, 38-39.

<sup>21</sup> *Arms Control Today* 25:3 (March 1995): 23; *White House Fact Sheet on Excess Fissile Material*, Office of the Press Secretary, March 3, 1995.

<sup>22</sup> Diana Cipollone, *The Fissile Material Cut-Off Debate: A Bibliographical Survey*, (New York: UNIDIR: 1996) p. xvi. As the title suggests, this book is an excellent bibliographical survey of all aspects of the fissile material cutoff debate up to the first half of 1996.

<sup>23</sup> See Undersecretary of State John Holum's Statement, "Holum Outlines U.S.-Russian Non-Proliferation Efforts" at Department of State Washington file website <http://usinfo.state.gov/topical/pol/arms/stories/00060905.htm>.

<sup>24</sup> David Albright, Frans Berkhout, and William Walker, *Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities and Policies* (Oxford: SIPRI and Oxford University Press, 1997), 455.

<sup>25</sup> It is beyond the scope of this discussion to discuss all of the many ongoing measures and initiatives to prevent fissile material proliferation. For a detailed

---

report on these ongoing initiatives, see David Albright, "Making the Grade? International Fissile Material Control Efforts," in David Albright and Kevin O'Neill, ed., *The Challenges of Fissile Material Control*, Institute for Science and International Security Report, 1999, 5; DOE (undated) "Megatons to Megawatts: Implementing HEU Transparency Measures, at [http://www.nn.doe.gov/pubs/megaton\\_watt.pdf](http://www.nn.doe.gov/pubs/megaton_watt.pdf); IAEA (1999) "IAEA Verification of Weapon-origin Fissile Material in the Russian Federation and the United States," Press Release, September 27, 1999 at [http://www.iaea.org/GC/gc43\\_pr/gcpr9910.html](http://www.iaea.org/GC/gc43_pr/gcpr9910.html); White House Background Briefing (2000) on bilateral initiatives reported at <http://usinfo.state.gov/topical/pol/arms/stories/00060403.htm>; William Walker and Frans Berkhout, *Fissile Material Stocks: Characteristics, Measures and Policy Options*, (Geneva: UNIDIR 1999).

<sup>26</sup> The trilateral group has met several times over the last three years (the last being in August 2000 in Vienna) to address the scope and purpose of IAEA verification; technologies that might be capable of performing verification and monitoring objectives without disclosing sensitive information; and options for funding and providing a legal framework for IAEA verification measures. In conjunction with its efforts, a verification agreement has been produced that will enable the IAEA to verify that hundreds of tons of fissile materials removed from U.S. and Russian military stockpiles never again return to nuclear weapons. It is expected that the agreement will be submitted to the IAEA Board of Governors when it meets in December 2000. See Energy Secretary Richardson's Statement to the 44<sup>th</sup> General Assembly of the IAEA, 18 September 2000 at website <http://usinfo.state.gov/topical/pol/arms/stories/00091907.htm>.

<sup>27</sup> Department of State Washington File News Release, "Gore Signs U.S.-Russia Plutonium Disposition Agreement," 1 September 2000 at website <http://usinfo.state.gov/topical/pol/arms/stories/00090108.htm>.

<sup>28</sup> Department of State Washington File News Release, "Gottemoeller Outlines Expanded Threat Reduction Initiative to Senate Subcommittee," 07 March 2000 at website <http://usinfo.state.gov/topical/pol/arms/stories/00030701.htm>.

<sup>29</sup> International Atomic Energy Agency Information Circular INFCIRC/549 (1998) contains the texts of the Guidelines for each of the nine countries as well as recent reports on their plutonium stocks

<sup>30</sup> Interviews with State Department Officials 9 July 2000, U.S. Delegation to CD, 23 August 2000. See also Statement by Steve Aoki, National Security Council Staff, at a public forum by the White House Office of Science and Technology, March 30, 1995.

---

<sup>31</sup> A naturally occurring, colorless, radioactive gaseous isotope of hydrogen used to enhance the effects of thermonuclear weapons. It is produced commercially from Lithium-6 by slow neutron bombardment in nuclear reactors. It also poses a radiation hazard from inhalation, as particles in the lungs may be a long-term carcinogenic hazard.

<sup>32</sup> State Department Interview, 9 July 2000.

<sup>33</sup> F. McGoldrick, "US Fissile Material Initiatives: Implications for the IAEA," IAEA Bulletin, vol. 37, no.1; interviews with DOD officials 12 July 2000.

<sup>34</sup> See M. Bunn, *The Next Wave: Urgently Needed Steps to Control Warheads and Fissile Materials* (New York: Carnegie Endowment 2000), 54.

<sup>35</sup> The NPT acknowledges the five states that have developed nuclear weapons before the Treaty entered into force, but as a condition of the parties acceptance of this special privilege the five Nuclear Weapons States agreed to work towards the eventual elimination of all nuclear weapons. This is known as the NWS's Article VI obligation under the NPT.

<sup>36</sup> U.S. Ambassador Grey statement to conference on disarmament , 28 June 1998, USIA Press Release 6/28 , [http://www.fas.org/nuke/control/fmct/docs/98062502\\_ppo.html](http://www.fas.org/nuke/control/fmct/docs/98062502_ppo.html)

<sup>37</sup> Steve Fetter and Frank von Hippel, "A Step-by-Step Approach to a Fissile Cutoff," *Arms Control Today* 25:8.

<sup>38</sup> Interviews with DOE officials 9 July 2000, State Department officials 19 July 2000, DOD officials 12 July 2000.

<sup>39</sup> NPT/CONF.1995/32/Decision 2, "Principles and Objectives for Nuclear Non-Proliferation and Disarmament," par. 4(b).

<sup>40</sup> Text of Speech may be found at Department of State website <http://usinfo.state.gov/topical/pol/arms/stories/grey.htm>.

<sup>41</sup> Almost all state members of the CD have voiced their support for a FMCT in one forum or another. See for example, statements contained in CD press releases DCF/327, 9 Mar 98; DCF/326, 26 Feb 98; DCF/325, 19 Feb 98; DCF 324, 13 Feb 98; and DCF 322, 3 Feb 98.

<sup>42</sup> Lewis A. Dunn, "A Nuclear Weapons Materials Production Cutoff: An Idea Whose Time Has Come," in UNIDIR Research Paper No. 31, *Halting the*

---

*Production of Fissile Materials for Nuclear Weapons* (New York; UNIDIR: 1994), 16.

<sup>43</sup> Permanent Mission of India to International Organizations in Geneva, Press Statement, dated "New Delhi, 11 May, 1998." Pakistan, remains reticent even with India's statement that it would be "happy to participate in," such negotiations.

<sup>44</sup> J.M. Taylor, *Restricting Production of Fissionable Material as an Arms Control Measure - An Updated Historical Overview*, SAND87-0901, Sandia National laboratories, Oct. 1988, 37.

<sup>45</sup> For an excellent account of the origins and recent history of the FMCT proposal, see Annette Schaper, *A Treaty on the Cutoff of Fissile Material for Nuclear Weapons-What to Cover? How to Verify?* (Frankfurt, Germany: Peace Research Institute Frankfurt Report 48, 1997), 5-18.

<sup>46</sup> For a brief history of the Acheson-Lilienthal report and the Baruch plan, see George Bunn, *Arms Control by Committee: Managing Negotiations with the Russians* (Stanford, CA: Stanford University Press, 1992), 59-61.

<sup>47</sup> U.S. Department of State, *Documents on Disarmament 1945-1959* (Washington D.C.: GPO 1960) Vol. 1, Document No. 4, 7-16.

<sup>48</sup> See John M. Taylor, *Restricting Production as an Arms Control Measure: An Historical Overview*, Sandia National Laboratory, Albuquerque, NM, December 9, 1983.

<sup>49</sup> Jozef Goldblat, *Arms Control* (London; PRIO: 1994), 31-32.

<sup>50</sup> Pandit Jawaharlal Nehru, the then Prime Minister of India, called for a "Standstill Agreement" in April 1954. The proposal was repeated at the UN General Assembly by Krishna Menon, in October 1954.

<sup>51</sup> UN General Assembly, 37th Session, Resolution 37/100A.

<sup>52</sup> United Nations General Assembly, 44th Session, Resolution 44/117D.

<sup>53</sup> General Assembly Official Records (GAOR), session 8, plenary mtg 470th; December 8, 1953, 450.

<sup>54</sup> Goldblat, n. 4, p. 32. For a detailed explanation and history of the IAEA See Lawrence Scheinman, *The International Atomic Energy Agency and World Nuclear Order* (Washington D.C.: resources for the Future, 1987).

- 
- <sup>55</sup> See, for example W. Epstein, "A Ban on the Production of Fissionable Material for Weapons," *Scientific American*, 243:1 (1980): 43-51; F. Von Hippel, et al., "Stopping the Production of Fissile Material for Weapons," *Scientific American*, 253:3 (1985): 40-47.
- <sup>56</sup> Fact Sheet, "Nonproliferation Initiative," The White House, Office of the Press Secretary, July 13, 1992.
- <sup>57</sup> Public Papers of the Presidents: 29 Weekly Comp. Pres. Doc. 1091, Sept. 27, 1993.
- <sup>58</sup> GA Res. A/RES/48/75L
- <sup>59</sup> Public Papers of the Presidents: 30 Weekly Comp., Pres. Doc. 80, January 14, 1994.
- <sup>60</sup> Oleg Bukharin, "The Future of Russia's Plutonium Cities" *International Security* 21:4 (Spring 1997): 131-32
- <sup>61</sup> "Gorbachev's Address at Guildhall," *Tass News Agency*, April 7, 1989, 1.
- <sup>62</sup> Ahmed Kamal, Pakistan's representative to the CD; speech to the conference plenary, June 9, 1994, CD/PV.681.
- <sup>63</sup> Conference on Disarmament, "Final Record of the Seven Hundred and Third Plenary Meeting," CD/PV 703; March 23, 1995, 17, See Annex B. See also, March 28, 1998 Speech by Grey on FMCT at [http://www.fas.org/nuke/control/fmct/docs/98032604\\_ppo.html](http://www.fas.org/nuke/control/fmct/docs/98032604_ppo.html)
- <sup>64</sup> Rebecca Johnson, Nuclear Nonproliferation News, no. 29, July 11, 1995, 2.
- <sup>65</sup> See for example, C. Raja Mohan, "India Losing Ground on N-Option," *The Hindu*, March 6, 1995.
- <sup>66</sup> *The United Nations Disarmament Yearbook 1995*, vol. 29, (New York: UN: 1996), 93
- <sup>67</sup> USIS Fact Sheet, November 7, 1996, New Delhi. See also Diana Cipollone, *The Fissile Material Cut-Off Debate: A Bibliographical Survey*, (New York: UNIDIR: 1996) xvi. As the title suggests, this book is an excellent bibliographical survey of all aspects of the fissile material cutoff debate up to the first half of 1996.
- <sup>68</sup> Quoted in n. 2, page 612, C.5.

---

<sup>69</sup> USIS Fact Sheet, November 7, 1996, New Delhi.

<sup>70</sup> Fetter and Von Hippel, *supra* note 4, at 8.

<sup>71</sup> Ministry of Defense, *French Policy: Arms Control, Disarmament and Non-proliferation* (MOD Pub., 2000), 50-2.

<sup>72</sup> INFCIRC/549, Guidelines for the Management of Plutonium signed by Belgium China, France, Germany, Japan, The Russian Federation, Switzerland, the United Kingdom and the United States and deposited with the IAEA, 1 December 1997. India did not participate since it is not a member of the NPT. Located at <http://www.iaea.org/cgi-bin/byteserver.pl/worldatom/infcircs/infcirc549.pdf>

<sup>73</sup> Interviews with DOE officials, 9 July 2000.

<sup>74</sup> Interviews with State official, 19 July 2000, US CD Del Officials, 24 August 2000.

<sup>75</sup> See Chinese and Russian Letter to the Conference on Disarmament, CD/1605, 27 January 2000 (copy on file with the author).

<sup>76</sup> Jenni Rissanen, Geneva Update, *Disarmament Diplomacy*, March 2000, 25.

<sup>77</sup> Chinese and Russian Joint Letter to the CD, CD/1605, of 27 January 2000, *supra*, note 71.

<sup>78</sup> U.S. Ambassador Robert Grey, Statement to the CD, February 17, 2000, CD/PV.842.

<sup>79</sup> Russian Ambassador Vasily Sidorov, Statement to the CD, March 23, 2000.

<sup>80</sup> Interviews with State Department officials 19 July 2000; Interview with Professor Ephraim Asculai, 29 June 2000; S. Schmemmann, "Israel Clings to 'Nuclear Ambiguity'," *The New York Times*, June 27, 1998, A6. See also S. Feldman, *Nuclear Weapons and Arms Control in the Middle East* (Cambridge: MIT Press, 1996).

<sup>81</sup> J. Brilliant, "Israel Agrees to Discuss Nuclear Treaty," *United Press International*, August 11, 1998, found at [web.lexis-nexis.com](http://web.lexis-nexis.com).

<sup>82</sup> Times of India, February 17, 1997.

<sup>83</sup> Times of India, June 1, 1997.

---

<sup>84</sup> India's continued pursuit of a nuclear weapons capability is complicated but probably is the result of a combination of four factors: India's quest for prestige and status in the international order, concerns over China's nuclear weapons capability, the rise of the jingoistic Bharatiya Janata Party (BJP) and its more muscular view of Indian defense policy, and possibly the culmination of a bureaucratic-scientific-technological momentum. See Sumit Ganguly, "Slouching toward Pokhran II: Three Explanations of India's Quest for the Bomb," *Disarmament Diplomacy* 38 (June 1999); V. R. Raghavan, "A debatable Nuclear Doctrine," *Times of India*, August 24, 1999.

<sup>85</sup> *Times of India*, June 2, 1997.

<sup>86</sup> Dunbar Lockwood in *Arms Control Today* 25:2 (March 1995): 30.

<sup>87</sup> Conference on Disarmament to meet informally next week on creating ad hoc committee on banning production of fissile material for nuclear weapons, Press Release DCF/343, 31 July 98.

<sup>88</sup> Ambassador Munir Akram's statement in the Conference on Disarmament on CTBT, FMCT issues, 30 July 1998.

<sup>89</sup> Interviews with U.S. CD delegation, 23 August 2000.

<sup>90</sup> G-21 Statement in the Conference on Disarmament. 11 August 1998, at website <http://www.acronym.org.uk/fmctdesc.htm>.

<sup>91</sup> U.S. Ambassador Grey called China's demands unrealistic by "employing these tactics may actually intend to produce utter paralysis, for the sake of blocking negotiations on a Fissile Material Cutoff Treaty." See Department of State Washington File, "Grey Says Calls for Outer Space Treaty Talks Are 'Unwise,'" at website <http://usinfo.state.gov/topical/pol/arms/stories/00091501.htm>.

<sup>92</sup> Measures include information about and inspector access to all aspects of States' nuclear fuel cycle; information about, and inspection mechanisms for, fuel cycle-related research and development; information on, and short-notice inspector access to, all buildings on a nuclear site; information on the manufacture and export of sensitive nuclear-related technologies and inspection mechanisms for manufacturing and import locations; collection of environmental samples beyond declared locations when deemed necessary by the IAEA; and improved administrative arrangements to provide access to sites by inspectors. See INFCIR/154 at the IAEA website: <http://www.iaea.org>.

---

<sup>93</sup> The IAEA has held a number of meetings on this very topic. See *IAEA Verification of Weapon-Origin Fissile Materials*, Third Joint Working Group Progress and Future Work Plan to Ministers and The Director General, September 1999.

<sup>94</sup> There are a number of different types of safeguards agreements and implementing arrangements. Examples and details on the various types of agreements are published in IAEA annual reports and are available on the IAEA web site: <http://www.iaea.org>.

<sup>95</sup> The basic safeguards agreement, denominated as INFCIR/153, is focused on declared facilities and nuclear materials. The Additional Protocol, denominated as INFCIR/540, now authorizes managed access to sensitive locations and access to the full range of possible activities related to the development of nuclear weapons.

<sup>96</sup> See Thomas E. Shea, "Reconciling IAEA Safeguards Requirements in a Treaty Banning the Production of Fissile Material for Use in Nuclear Weapons or Other Nuclear Explosive Devices," *Disarmament Forum* 2 (1999): 57-71.

<sup>97</sup> Interviews with State Department Officials, 9 July 2000; Arms Control and Disarmament Agency Fact Sheet, *Fissile Material Production Cutoff Treaty (FMCT) Negotiations*, March 27, 1997.

<sup>98</sup> Frank N. Nov Hippel, "The FMCT and Cuts in Fissile Material Stockpiles," *Disarmament Forum* 2 (1999): 38.

<sup>99</sup> *A Cut-off Treaty and Associate Costs*, IAEA Secretariat working paper presented at the Workshop on A Cut-Off Treaty, Toronto, Canada, 17-18 January 1995, on file with the author. The use of remote monitoring and new technologies to reduce the need for on-site inspections and the fact that some facilities in the nuclear weapons states are already under IAEA safeguards due to "voluntary offers" and other arrangements probably reduced the estimated costs stated in this paper.

<sup>100</sup> IAEA, Annual Report for 2000, table at <http://www.iaea.org/GC/gc43/documents/gc43-6.html>.

<sup>101</sup> Stephen I. Schwartz 9ed.), *Atomic Audit: The Costs and Consequences of U.S. Nuclear Weapons Since 1940* (Washington D.C.: Brookings Institution Press, 1998), 560-61.

<sup>102</sup> Interview with Director General Mohamed Elbaradei, 24 August 2000. See also William Drozdiak, "U.N. Atomic Agency is Threatened by Financial Crisis," *The Washington Post*, August 8, 2000, 1.

---

<sup>103</sup> The IAEA has readily acknowledged that they are unable to "physically prevent diversion of nuclear materials or the setting up of an undeclared or clandestine nuclear weapons program." See IAEA Publication, *The IAEA Safeguards System: Ready for the 21<sup>st</sup> Century*, IAEA Division of Public Information, September 1997, 15.

<sup>104</sup> The expert on options for the scope of the FMCT was Annette Schaper. See her paper for the conference entitled "Fissile Materials for Nuclear Weapons and Other Nuclear Explosive Devices." This was based on A. Schaper, "A Treaty on the Cutoff of Fissile Material for Nuclear Weapons—What to Cover? How to Verify?" (Frankfurt, Germany: Peace Research Institute Frankfurt Report 48, 1997). See also Schaper, "The Case for Universal Full-Scope Safeguards on Nuclear Material," *The Nonproliferation Review* 5 (Winter 1998), 91.

<sup>105</sup> See Hiroyoshi Kurihara, "Chairman's Summary, Seminar Conference on Technical Issues for a FMCT" Geneva, May 11-12, 3-4.

<sup>106</sup> Ibid.

<sup>107</sup> Id. At p. 5; Statement of John B. Campbell, Head of Australian Delegation, April 30, 1998, to the 1998 NPT Preparatory Committee meeting, 3.

<sup>108</sup> Working Paper Elements of an Approach To Dealing With Stocks of Fissile Materials for Nuclear Weapons or Other Nuclear Explosive Devices, CD/1578 18 March 1999.

<sup>109</sup> See the discussion Electronic Conference, "The Future of the Conference on Disarmament" January 12-23 at <http://www.stimson.org/zeronuke/forum/cd1.htm#pl0112>.

<sup>110</sup> Statement of Ambassador Munir Akram, Pakistan, to the CD, 11 August 1998. Available on the web at <http://acronym.org.uk/fmctdesc.htm>.

<sup>111</sup> Ambassador Robert Grey, Speech to the CD, 17 February 2000, U.S. Information Service Washington File at web site: [www.usinfo.state.gov](http://www.usinfo.state.gov).

<sup>112</sup> The classic definition of arms control is "all the forms of military cooperation between potential enemies in the interest of reducing the likelihood of war, its scope and violence if it occurs, and the political and economic costs of being prepared for it." Thomas Schelling and Morton Halperin, *Strategy and Arms Control* (New York: Pergamon-Brassey's, 1985), 2. The authors argue that "Adjustments in military postures and doctrines that induce reciprocal adjustments by a potential opponent can be of mutual benefit

---

if they reduce the danger of a war that neither side wants, or contain its violence, or otherwise serve the security of the nation." Id. at 143.

<sup>113</sup> Quoted in David Fromkin, "The Latest Arms-Control Failure. . ." Wall Street Journal, October 12, 1999, 26.

<sup>114</sup> See R.J. Rummel, *Death by Government* (New York: University Press 1994).

---